

Delaware and Hudson Canal Company Gravity Railroad: 1829 Configuration



Gravity Railroad Monument, Gravity Park, Carbondale, PA.
Photograph by S. R. Powell, 2011

By
S. Robert Powell, Ph.D.

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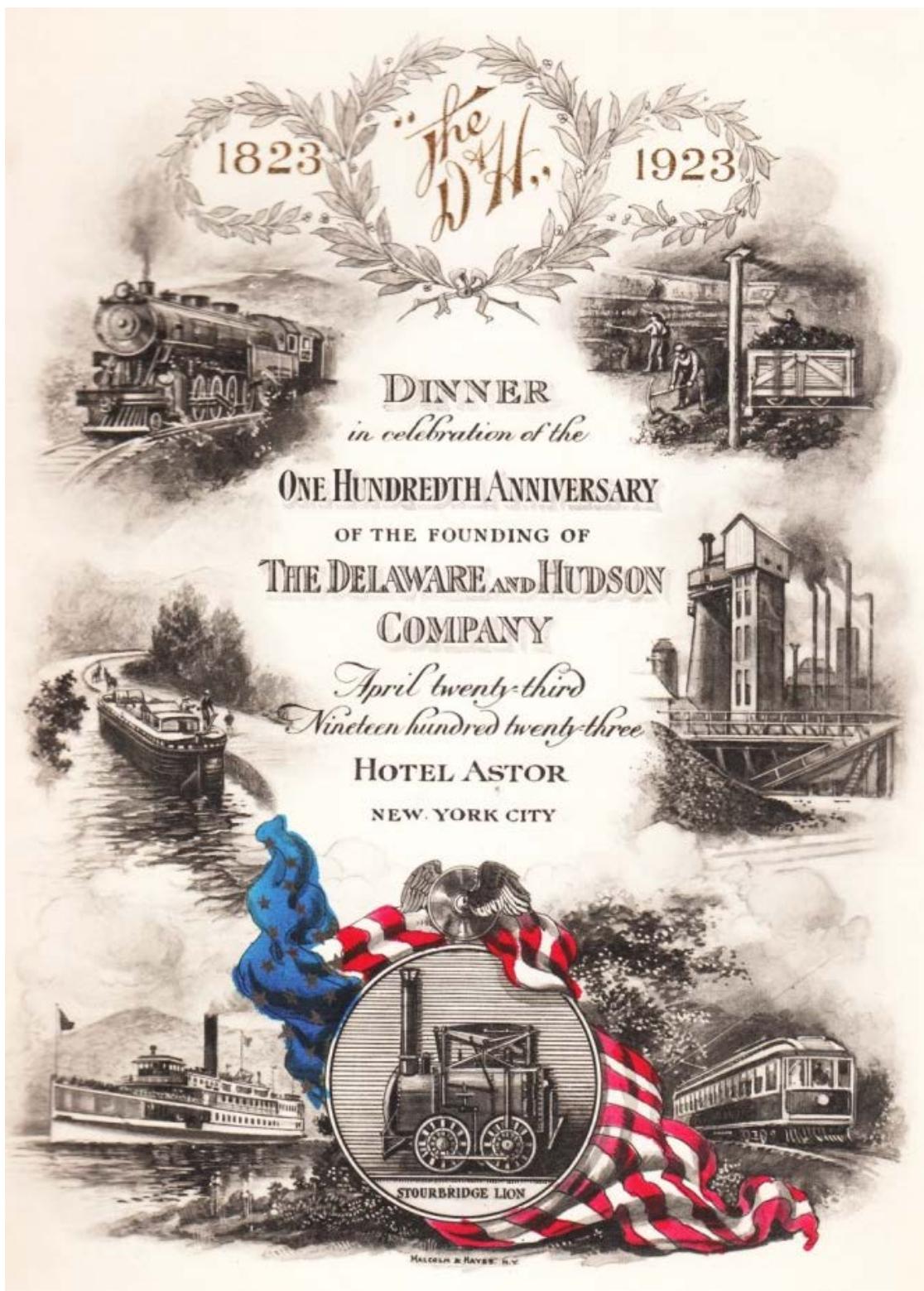
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To Begin

“Let us take heart from the adventures of our forefathers. Let us be guided by their experience and aspirations, not because they are ancient but because they are ever young. Retracing our steps from the morass into which we have wandered, let us return to the solid land, not because we wish to look back, but because we are determined to go forward. Guided by their example, let us set out anew upon the course they so long pursued with such enormous advantage to themselves and to us, their descendants, that we may hand on to our successors a heritage at least as rich as the one we received.”

Leonor Fresnel Loree, who served as president of the D&H from 1907 to 1938, at the conclusion of his remarks at the D&H centennial banquet in the Hotel Astor in New York City on April 23, 1923





SPEAKERS

INVOCATION BY

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New York, N. Y.

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Member, Anniversary Dinner Committee,
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Assistant to the Director, The Science Museum,
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THE USE OF STEAM POWER

HON. MARTIN W. LITTLETON,
SOME FUNDAMENTALS

A History of the
Delaware and Hudson Canal Company
in 24 Volumes

S. Robert Powell, Ph.D., 1974
Indiana University, Bloomington, IN

I	Gravity Railroad: 1829 Configuration
II	Gravity Railroad: 1845 Configuration
III	Gravity Railroad: 1859 Configuration
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Acknowledgements

The 24 volumes in this series could not have been written without thirty years of enthusiastic support and guidance from John V. Buberniak, who shares the present author's interest in the history of the Delaware and Hudson Canal Company's Gravity Railroad and Canal.

It is with great pleasure, therefore, that I here (1) acknowledge the crucial role that John V. Buberniak has played in the writing of these books on the D&H, and (2) express my thanks to him for all that he has done to make these books possible.

Another Gravity Railroad historian to whom sincere thanks are due is the late W. E. Anderson, who was Assistant Engineer for the Delaware and Hudson Canal Company and Chief Engineer of the Delaware and Hudson Company for many years.

In 1895, W. E. Anderson brought into existence a map volume titled:

*Delaware and Hudson Canal Company.
Gravity Railroad / Carbondale to Honesdale, 1895.*

In March 1901, W. E. Anderson created a map volume titled:

*Delaware & Hudson Company's Railroad, Honesdale Branch,
Carbondale to Honesdale. March 1901.*

Using those maps, we have been able to identify and describe the five separate configurations (1829, 1845, 1859, 1868, and 1899) of the D&H rail line from Carbondale to Honesdale in the nineteenth and twentieth centuries.

S. Robert Powell
Carbondale, PA 18407
October 9, 2014

Overview

The industrial revolution in America was born on October 9, 1829, in Carbondale, PA, when the first cut of Delaware & Hudson Gravity Railroad coal cars, loaded with mass produced anthracite coal, headed up Plane No. 1 out of Carbondale for Honesdale and to market in New York City.

Those cars, filled with anthracite coal from mines in Carbondale, traveled over 16 miles of railroad tracks, made up of eight inclined planes and three levels, to Honesdale, where the coal was transferred into canal boats and hauled 108 miles, through the D&H Canal, to the Hudson River.

Most of the coal that was sent through the D&H system in the course of the nineteenth century was shipped south on the Hudson River to the New York metropolitan market and to many ports on the Atlantic seaboard, north and south of New York. A large quantity of anthracite coal was also shipped up the Hudson River to Albany, and shipped through the Erie Canal to the American Midwest.

The mining, manufacturing, and transportation system that became operational on that day between the anthracite mines of the Lackawanna Valley and the retail markets for that coal on the eastern seaboard and in the American Midwest was the product of enlightened entrepreneurial, technological, and managerial thought on the part of the officers, managers, directors, and employees of the Delaware and Hudson Canal Company. That system, the first private sector million-dollar enterprise in American history, was, at the same time, the pioneer expression on this continent of mass production, a mode of production that would thereafter characterize industry in America and around the world.

Mass production, the revolutionary engine that made it possible for the D&H to launch its mining, manufacturing, and transportation system in Carbondale on October 9, 1829, and to perpetuate that system well into the 20th century, came into existence when it did and lasted for as long as it did because a body of employees and managers, within the context of a community, of which both groups were a part, chose to work together for their mutual benefit and enrichment, to mass produce and market a commodity, and in so doing to implement the clearly articulated production and marketing objectives of “the company,” the Delaware and Hudson Canal Company.

In this 24-volume work on the D&H,* we will (1) document the history of that mining, manufacturing, and transportation system, with a special focus on the rail lines of the Delaware and Hudson Canal Company in northeastern Pennsylvania, from the opening of the D&H Gravity Railroad in 1829 to the anthracite coal strike of 1902; and (2) demonstrate that the history of that mining, manufacturing, and transportation system, the D. & H. C. Co., from 1829 to 1902, is, at the same time, not only an illustration of eight decades of fine tuning by the D&H of their mass production procedures and techniques but also a full-bodied expression and record, both from the point of view of the D&H and from the point of view of its employees, of the birth, development, and first maturity of the industrial revolution in America.

This is a success story, directed by America's pioneer urban capitalists, and implemented by them and the tens of thousands of men, women, and children who emigrated from Europe to the coal fields of northeastern Pennsylvania in the nineteenth century to work for and with the D&H and to start their lives over again. This is a success story that is important not only within in the context of local, state, and regional history but also within the context of American history. It is a compelling story.

*This is Volume I. It focuses on the 1829 configuration of the Gravity Railroad. Each of these 24 volumes will focus on one aspect of the history of the Delaware and Hudson railroad, from the opening of the Gravity Railroad in 1829 to the anthracite coal strike of 1902. Each volume will be an autonomous entity and published separately.

Preface

The proprietary government of Pennsylvania (the Susquehanna Company of Connecticut) purchased from the Indians of the Six Nations, at Fort Stanwix in the Province of New York, on July 11, 1754, for 2,000 pounds New York currency, equal to \$10,000 in silver, a section of land about 125 miles long and 35 miles wide. Practically all of the anthracite coal fields of northeastern Pennsylvania—and three-fourths of the earth's anthracite coal deposits—are located in this 484-square-mile tract of land, which was divided geographically into four distinct, canoe-shaped coal fields, all having their greatest length in a northeasterly to southwesterly direction. This anthracite coal was formed more than 250 million years ago during the Pennsylvania period of the Paleozoic era.

Those four coal fields, or basins, are the Northern Field (176 square miles), Eastern Middle Field (33 square miles), Western Middle Field (94 square miles), and Southern Field (181 square miles). Although separated from each other, these four fields are adjacent to each other and are

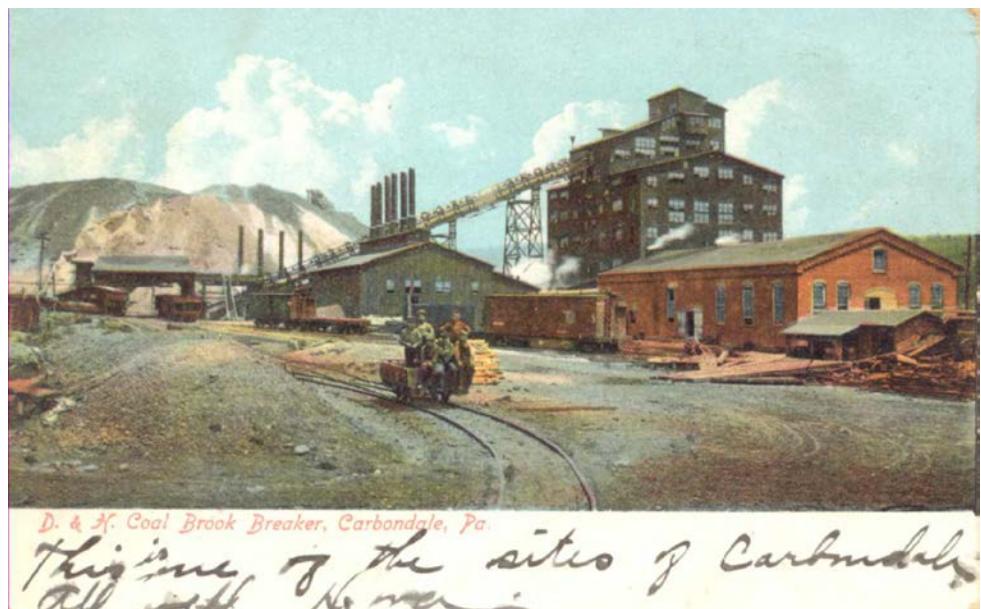


1142. View of Carbondale, seen from Head of No. 28 Plane. ("A Ride over the Del. & Hud. Gravity Road into the Coal Regions, Photographed and Published by L. Hensel, Port Jervis, N.Y.) Original stereocard in the collection of the Carbondale Historical Society

located in Wayne, Susquehanna, Lackawanna, Luzerne, Carbon, Schuylkill, Columbia, Northumberland, and Dauphin counties.

These fields are divided into three regions: the Wyoming, Lehigh, and Schuylkill. The Wyoming region comprises the Northern Field. The Lehigh region comprises the Eastern Middle Field. The Schuylkill region includes the Western Middle and Southern Fields.

The beds of the Northern, or Wyoming, Field are comparatively flat/horizontal, until they pitch upward at the outcrops on the mountain sides that rim the valley, while the Eastern Middle and Western Middle Fields contain both flat and very steeply pitching beds, the latter being heavily faulted, which makes mining not only difficult but also hazardous. In the Southern, or Schuylkill, Field the coal beds lie almost entirely in very deep basins and at steeply pitching angles. The Lackawanna and the Wyoming Valleys constitute the entire northern anthracite coal field, which begins in Forest City and extends to Nanticoke. The upper part of the valley took its name from the Lackawanna River, which flows through the land from above Carbondale and down to Pittston, where it enters the Susquehanna River. The Wyoming Valley is the area through which the Susquehanna River flows from Pittston to Nanticoke.



D. & H. Coal Brook Breaker, Carbondale, Pa. Post card in the collection of the Carbondale Historical Society. (No. A 10871 Published by The American News Company, New York, Leipzig, Berlin, Dresden).

The Northern, or Wyoming, Field, containing the deepest anthracite deposits, having the highest carbon content, is described in *The Story of Anthracite* (Hudson Coal Company, 1932, p. 14) as follows: "This field extends from Forest City [on the Lackawanna River] on the east to Shickshinny [on the Susquehanna River] on the west, a distance of about fifty-five miles. It is a crescent-shaped basin, reaching at Wilkes-Barre a maximum breadth of about six miles and

having a total area of about 176 square miles. The westerly cusp of the crescent lies just north of the Eastern Middle Field and extends in a northeasterly direction through Luzerne and Lackawanna counties, just dipping into Wayne and Susquehanna counties at the other extremity of the crescent. The principal cities in this field are Carbondale, Scranton, Wilkes-Barre, Pittston, and Nanticoke."

The Delaware and Hudson Canal Company was brought into existence to mine and market that company's anthracite holdings in the Northern, or Wyoming, Field. In the twenty-four volumes in this series, we will present the history of the Delaware and Hudson Canal Company in the nineteenth century.



Archibald F. Law. Born in Wanlockhead, Scotland, in 1799. He was the son of Charles and Ann Falconer Law, and he came to the United States in the spring of 1830, and first worked for the Delaware and Hudson Canal Company as a coal inspector. Soon after, he assumed the charge of the original underground mine with cars and track in the United States. He served as Mine Superintendent of the D&H from 1832 to February 1843, when he was severely injured by a fall of coal, which totally paralyzed his legs. He was elected Justice of the Peace in 1846 and served in that capacity until his death in June 1848, at the age of 48. Shown here is a photograph, by Hank Loftus, of the original oil painting of Archibald F. Law in the collection of the Carbondale Historical Society. This painting was donated to the Carbondale Historical Society by Donald Law, Phoenix, AZ.

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Introduction

It is not possible to talk about the beginnings of the D&H without first talking about William and Maurice Wurts, the Wurts Brothers, whose likenesses are given below.



William Wurts (1788-1858)



Maurice Wurts (1783-1854)

The founding fathers of the D&H were William and Maurice Wurts. Their likenesses are reproduced here from pages 10-11 of *A Century of Progress History of The Delaware and Hudson Company 1823-1923*. (hereinafter, COP)

William, Maurice, and John Wurts: The Pioneers

Who was the master mind?

Which of the two Wurts brothers, William or Maurice, was the master mind of the initiative of the two brothers to mine anthracite coal in northeastern Pennsylvania and to market that coal in New York? Some say it was William, others say it was Maurice.

In an undated newspaper article titled "The Celebrated Gravity Road" (probably published in the *Carbondale Leader* in the 1890s) in the archives of the Carbondale Historical Society, the author

identifies William Wurts as the prime mover in the formation of the D&H. He states: "The Gravity railroad and the D. & H. canal are the thought of William Wurts and his name deserves to be placed beside that of Cyrus Field as a financier and a man of indomitable energy. He, aided by his brother, conceived the project, raised the necessary money, \$1,300,000, and carried his plans to execution."

On the other hand, in the obituary of Maurice Wurts, given below, we read: "In awarding to Mr. [Maurice] Wurts the first place in this enterprise, we do no injustice to those by whom he was seconded. He was the master mind, the impelling and controlling power. His exertions, the reliance upon his resources, the weight of his name and character, retrieved it from the prostrations it encountered by disasters and the incompetency of other management."

And then there was brother John (1792-1861), who served in the Pennsylvania legislature and in the U. S. Congress and was very useful to his brothers in getting favorable legislation passed on behalf of the Wurts brothers' interests. John Wurts was subsequently elected the third president of the D&H on April 13, 1831, an office which he held until 1858.

The important role played by President John Wurts in the early years of the history of the Delaware and Hudson Canal Company is highlighted by H. Hollister in his unpublished history, dated 1880, of the Delaware and Hudson Canal Company. Therein, on page iii of the Preface, Hollister starts: "This association [the D&H] began life under a weight of many unexpected embarrassment[s] dissipated only in after years by the able administration of President John Wurts, a man of acknowledged purity of personal character. For the first ten years of its existence it [the D&H] lay upon the edge of bankruptcy, impaired in credit, mistrusted and maligned, just able to keep the wolf from the door, now [1880] it is independent and self maintaining and by its fair dealing and probity stands in the front rank of coal companies, under the same system of general management inaugurated by the lamented John Wurts."

Who was the master mind? I'm not sure that one can or should even try to answer such a question. What really matters is that the Wurts brothers, William and Maurice, together with their brother John, were highly successful entrepreneurs in the history of anthracite mining. It is well that we take a closer look here at the history of this remarkable family.

The Wurts Family

The Wurts (sometimes spelled *Wurtz*) family originated in Switzerland, where the family name was spelled *Wirz*. The grandfather of the Wurts brothers who played a central role in the history of the D&H was Johannes Conrad Wirz (1706-1763), who came to America in 1734 as part of the German pietist emigration to the Middle Colonies.

Johannes Conrad Wurts had four sons, the oldest of whom was John Jacob Wurts (1744-1793), an iron manufacturer and owner of several forges, who settled in Flanders, Morris County, NJ, and married Sarah Grandin in 1793. They had nine children, three of whom (Maurice, William, and John) were key figures in the history of the D&H.

Another of those nine children of John Jacob Wurts and Sarah Grandin was George Wurts, who had two sons who played important roles in the history of the D&H: William Wurts, 1809-1858; and Charles Pemberton Wurts, 1824-1892. This same William Wurts, 1809-1858, also had a son, Theodore Frelinghuysen Wurts, 1844-1911, who worked for the D&H in Carbondale.

Maurice Wurts (1783-1854)

Maurice Wurts (b. 06-16-1783 in Flanders, NJ). At about the age of 18, Maurice Wurts moved to Philadelphia and found work in a dry goods store, of which he ultimately became sole owner. About 1808 he went to England for about 3 years for health reasons. About 1810, he returned to the USA with a substantial inventory of goods that he sold here in America at a good profit. William, his younger brother, joined him and became a partner in the dry goods business around 1810. In 1812, the Wurts Brothers were awarded a contract by the U. S. Government to supply clothing to the army in the war against Great Britain. In partial payment from the government, they were given 70,000 acres in northeastern Pennsylvania along the Lackawanna River. In 1814, the Wurts Brothers came here, saw the coal, and realized its economic potential. They acquired more land, some with the help of David Nobles. Their dry goods business went into liquidation probably before 1820.

Maurice Wurts, one of the founding fathers of Carbondale, and a manager of the D&H (1825-26, 1848-54), died on December 29, 1854, at the age of 72, in Philadelphia. His earthly remains are buried in the family cemetery at Pleasant Mills, near Batsto, Atlantic County, NJ.

Here is the obituary of Maurice Wurts that was published in the *Carbondale Transcript and Lackawanna Journal*, January 12, 1855 p. 2:

"Death of Maurice Wurts. / This gentleman, so well known to our citizens, died at Philadelphia on the 29th of December last, in the 72d year of his age. We extract the following from the *Rondout Courier*. / Some thirty years ago Maurice Wurts gave all his energies to, and staked all his hopes on the project of a canal from the Pennsylvania coal fields to the Hudson river. He explored the route now traversed by the Delaware and Hudson Canal, when it was to a great extent a wilderness; enlisted men of capital in the enterprise by demonstrating its soundness; procured the countenance of the legislatures of Pennsylvania and New York and the pecuniary aid of the latter, and after a severe struggle against obstacles and discouragements which would have utterly disheartened most men, saw the purpose of his life achieved in the position now held by the Delaware and Hudson Canal Company. In awarding to Mr. Wurts the first place in this enterprise, we do no injustice to those by whom he was seconded. He was the master mind, the impelling and controlling power. His exertions, the reliance upon his resources, the weight of his name and character, retrieved it from the prostrations it encountered by disasters and the incompetency of other management. / The Delaware and Hudson Canal, apart from the direct benefits of its coal trade, and the incidental business springing from that traffic, has given a ten fold value to the valleys through which it winds its way and the adjacent country, by developing their resources. The lime and cement, the lumber, and diverse products made available, and manufacturing springing up from the Hudson to the Delaware all owe their existence to this canal. The wilderness has given place to a cultivated country, rich in population and rife with

industry. Had it not been for the forecast of Maurice Wurts, all these advantages would have been deferred for years, if ever attained. We who realize and enjoy the benefits of his exertions, can hardly estimate the impediments thrown in his way by the incredulity, apathy, indifference, and lack of enterprise he encountered and overcame. But those who know the history of his work will not hesitate in recording his name among the first which ought to be spoken of with praise by the people for whom he has done so much. / We have spoken of Mr. Wurts as a business man, but would be doing his memory injustice if we failed to speak of his personal character and the example of his life. He was a gentleman of marked purity of life, dignity of deportment and high moral character. He never forgot what was due to himself or others. His position and its demands had given him a decision which might have impressed the casual observer as sternness, but those who knew him intimately, will bear witness to his eminent social virtues, and especially to his benevolence, which manifested itself in countless unobtrusive charities, and a prompt and liberal aid to any sound enterprise, moral, religious and social. The wealth so honorably gained, was used liberally and wisely, and the 'Stewardship' which is the only Christian tenure of abundance, was fully recognized by Mr. Wurts throughout his life." (*Carbondale Transcript and Lackawanna Journal*, January 12, 1855, p. 2)

William Wurts (1788-1858)

William Wurts. (b. 05-06-1788—d. 12-25-1858, at Trenton, aged 70). One of Carbondale's founding fathers. Probably buried in Pleasant Mills Grave Yard, Batsto, NJ. William Wurts had a partnership with his brother Maurice, which went into liquidation, probably before 1820, around which time William and Charles Stewart Wurts (another Wurts brother) went into the dry goods business. William Wurts was living in retirement in 1856 in Trenton, NJ.

In praise of Maurice and William Wurts by Hollister (unpublished typescript, 1880):

"Maurice and William Wurts, who disputed with the wolf for the possession of the wilderness in Rixe's Gap sixty odd years ago, were gentlemen of great foresight, courage and persistence; with no thought but that of ultimate triumph, with no aid but their own inherent determination to succeed, destitute sometimes of shelter and food as they carried their lonely explorations on foot in the forest for years upon the Moosic range or along the valleys of the Lackawanna, Lackawaxen, Delaware, Neversink and Rondout were worthy of the perpetual memory in which they are held by the Company whose existence was a gift of their efforts. As founders of the Delaware and Hudson Canal Company they won the good opinion of the commercial world by their integrity of character and uniform fair dealings with all, and lived to see their early sanguine expectations fully realized. Maurice Wurts died Dec. 29, 1854; William Wurts a few years later full of years and honor." (p. 51)

John Wurts (1792-1861)

John Wurts. (b. 08-13-1792 in Flanders, Morris County, NJ, d. in Rome, Italy, on April 23, 1861, at the age of 68). After the death of John Wurts' father in 1793, the family resided in Montville, Morris County, and subsequently moved to Philadelphia. John Wurts graduated from Princeton College in 1813; studied law; was admitted to the bar in 1816 and commenced practice in

Philadelphia. Married Martha Potts Haskins, who left her considerable estate, when she died in 1871, to Charles Pemberton Wurts, her nephew (son of George). He was elected a member of the State house of representatives in 1817; served in the State senate in 1820; elected to the Nineteenth Congress (March 4, 1825-March 3, 1827); was not a candidate for re-nomination; United States district attorney 1827-1831; member of the city council of Philadelphia. He was elected third president of the D&H on April 13, 1831, an office which he held until 1858. He went abroad for his health, sailing on October 12, 1850, and remaining abroad for about a year. (Beginning in 1849, when the health of John Wurts began to fail, his brother Maurice acted as temporary president of the D&H.) At Rome, Italy, on April 23, 1861, ex-president of the D&H, John Wurts, died; interment in the family cemetery at Pleasant Mills, near Batsto, Atlantic County, N.J.

George Wurts (1777-1835)—older brother of Maurice, William, and John

George Wurts. (b. Lamington, NJ on 06-29-1777—d. 03-08-1835; interred in Orange, NJ). He was a doctor; married Abigail Petitt (daughter of Amos Petitt). They had 13 children, one of whom was **William Wurts** (b. November 25, 1809 in Montville, NJ; d. in Carbondale on July 15, 1858; buried in Maplewood Cemetery.) He became a lawyer and practiced law in Carbondale and then in Wilkes-Barre from 1836-1847. When he returned to Carbondale in 1847 (resided at 419 Main Street) he practiced law, opened a lumber business and was involved in buying and selling real estate. He was an attorney for the D&H. Married Lucretia Jeanette Lathrop (daughter of Salmon Lathrop and Aurelia Noble) on March 17, 1836, and they had eight children, one of whom was **Theodore Frelinghuysen Wurts**. (b. 05-31-1844, Wilkes-Barre--1911). Born in Wilkes-Barre. In 1848 the family moved to Carbondale, where the father was attorney for the D&H C. Co. railroad and his great Uncle John Wurts was president. He completed a course of study at Carbondale High School. At the age of 16 he worked in the D&H railroad shops at Carbondale, where he acquired some knowledge of mechanics. From there he went to the Cliff Works in Scranton for a short time, where he worked for a time on locomotive No. 1, the *C. P. Wurts*, owned by the Delaware and Hudson Railroad, and was engaged on surveys for the first passenger railroad for this company. During the Civil War he enlisted in the **Wurts Guards**, (which was raised in 1862 "largely through the active agency of C. P. Wurts, Esq.," uncle of Theodore F. Wurts), that was part of the Thirteenth Regiment, Pennsylvania Militia.

Charles Pemberton Wurts (1824-1892)

Another son of George and Abigail Petitt Wurts was Charles Pemberton Wurts (nephew and adopted son of John Wurts, 3rd president of the D&H). Born in 1824 in Montville, NJ, began working for the D&H at age 19, died in 1892. C. P. Wurts married Laura Jay in 1854. She was a granddaughter of Peter Augustus Jay and the great granddaughter of Supreme Court justice and diplomat John Jay. They had 6 children. Soon after his arrival in Carbondale, in 1843, he was appointed assistant to James Archbald, the general superintendent of the D&H, serving in that capacity until James Archbald removed to Scranton in 1853, when C. P. Wurts assumed entire charge of the D&H's affairs. About 1856, Charles Pemberton Wurts (a son of George Wurts and Abigail Petitt, which made him a nephew of the D&H founders) and Maurice Wurts (another son of George Wurts and Abigail Petitt, which made him as well a nephew of the D&H founders;

from 1845 to 1855 he served as the paymaster or general disbursing agent of the Del. & Hudson Canal Company at Carbondale) plus members of the Dickson and Pierson families moved to Scranton and erected a foundry and machine shop, known as Dickson & Co. (manufacture and repair of mining machinery—later Dickson Manufacturing Company). C. P. Wurts played a key role in the establishment of the 1856-1858 configuration of the roadbed of the D&H Gravity Railroad. At this time the D&H purchased 16 75-horse power engines from the Dickson Manufacturing Company, Scranton, for use on all planes. C. P. Wurts continued in charge of the Delaware & Hudson interests until 1864, when he was succeeded by Thomas Dickson. Upon the death of his Aunt Martha Potts Haskins Wurts (widow of former D&H Canal Company president, John Wurts) in 1861, C. P. Wurts was named the main beneficiary of her considerable estate, which caused some friction in the family. Upon his retirement C. P. Wurts went abroad with his family and spent several years in Europe. C. P. Wurts and his family moved to New Haven, CT in the mid 1877.

Three newspaper notices about C. P. Wurts:

1864: "We learn that C. P. WURTS, Esq., of this city, at the head of a corps of Engineers, is now engaged in adjusting the line of the Jefferson Railroad." (*Carbondale Advance*, May 28, 1864, p. 2)

1864: "C. P. WURTS, Esq., Chief Engineer, with a corps of assistants, is now engaged in locating the proposed Railroad up the Lackawanna." (*Carbondale Advance*, July 23, 1864, p. 2)

1881: [C. P. Wurts falls ill]: "C. P. Wurts, Esq, former R. R. Supt. here, was taken seriously ill at the St. Charles Hotel in Scranton, about two weeks since. Mr. G. L. Dickson learning of it had him conveyed to his residence, where by careful nursing he recovered so as to be able to return home on Saturday last." (*Carbondale Advance*, June 11, 1881, p. 3)

Obituary of C. P. Wurts:

"CHARLES P. WURTS DEAD. / He Was Formerly Superintendent of the D. & H. and Lived Here. / Yesterday's New York Tribune contained a brief notice of the death of Charles Pemberton Wurts, which occurred at Bar Harbor, Maine, August 11th in the sixty-ninth year of his age. / Just half a century ago Mr. Wurts came to this city [Carbondale] and for a time was a member of the Delaware & Hudson Canal company's engineer corps. He was the nephew and adopted son of John Wurts, at that time president of the Delaware & Hudson Canal company. Soon after his arrival here he was appointed assistant to James Archbald, the general superintendent, serving in that capacity until Mr. Archbald removed to Scranton, when Mr. Wurts assumed entire charge of the company's affairs in this locality. It was under his administration that the present gravity railroad was constructed and many changes made in the

methods of transporting the product of the mines from the valley of the Lackawanna to the canal which at that time was the company's only means of reaching New York city and tidewater. In those days Mr. Wurts was general manager of all the company's business, and to him all differences were referred. The first great strike at the company's collieries took place in 1857, when the miners made a demand for an advance of two and one-half cents per ton. The regular price for mining at that time was thirty-five cents. After several weeks of idleness the miners resumed work upon the promise of Mr. Wurts that the advance asked for would be given them when operations were resumed. This was the one condition fixed by Superintendent Wurts, the men took him at his word and had no reason to regret it. / Many of the old residents will remember how the miners congregated every afternoon on the hill east of Park street to talk over their differences and it was then Mr. Wurts met them and effected the settlement on which operations at the mines were resumed. / During his residence here Mr. Wurts built the house and reclaimed the grounds now owned and occupied by E. E. Hendrick. / From that year 1860 to 1863 Mr. Wurts was in partnership with W. H. Richmond in the Elk Hill colliery at Dickson City and about the same period he was associated with Edward Jones, Lewis Pughe, and Abel Barker in developing the mines at Olyphant. He was also identified with other industries in this locality and was known as a progressive business man of this community. He took an interest in local affairs and was always ready to assist in any movement to better the condition of the men in the employ of the Delaware & Hudson Canal company. / Mr. Wurts continued in charge of the Delaware & Hudson interests until 1864, when he was succeeded by Thomas Dickson. Upon his retirement Mr. Wurts went abroad with his family and spent several years in Europe. For the past fifteen years he has been a resident of New Haven, Conn. / Of the men who were actively engaged in coal operations during the years Mr. Wurts was general superintendent of the chief corporation of the Lackawanna valley, few are alive at present. Among the first operators who had contracts to ship coal over the Delaware & Hudson lines were William Brennan, J. Offerman, J. C. Chittenden, A. Eaton, George and John Simpson, Edward Jones, Lewis Pughe, Abel Barker, W. H. Richmond, J. J. Albright, G. L. Dickson, John Jermyn. Of this number only four are living and only two, Messrs. Richmond and Jermyn, are actively engaged in the coal business." (*Carbondale Leader*, August 16, 1892, p. 4)

The C. P. Wurts House in Carbondale

The C. P. Wurts House (later to become the Eli E. Hendrick house in Hendrick Park; property conveyed by deed from Thomas Sweet and Charlotte Sweet to Charles P. Wurts on April 20, 1852): house and grounds based on designs by Andrew Jackson Downing (commissioned in 1851 at an annual salary of \$2,500 to landscape the public gardens near the Capitol and the White House in Washington); grounds surrounding Wurts house planted by Alexander Shannon of Carbondale. Eli Hendrick became the owner of the C. P. Wurts house in 1865 (deed dated June 16, 1865, from Charles P. Wurtz and Laura Wurtz, his wife, to Eli E. Hendrick). Payment for the house and grounds: Eli Hendrick traded C. P. Wurts \$100,000 of the stock of the Great Northern Oil Company for the Wurtz residence.

We will focus on Charles Pemberton Wurts in greater detail in the volumes on the 1845 configuration and the 1859 configuration of the Gravity Railroad.

And now, having had a closer look at some of the members of the remarkable Wurts family (about several of whom we will present a lot more in the pages that follow), we shall direct our attention to the discovery of coal in northeastern Pennsylvania and how to burn it.

The Discovery of Coal in Northeastern Pennsylvania, and How to Burn It

In 1808, fifty four years after the purchase of these coal lands in 1754 from the Indiana of the Six Nations, Jesse Fell, of Wilkes-Barre, succeeded in burning coal in a common grate. Two years later, in the Autumn of 1810, Preserved Taylor used a few lumps of coal for a fire in his kitchen on his farm north of Hyde Park. In *Hollister*, 1880, re read:

"Preserved Taylor, an old gentleman, of considerable observation and judgment, who lived on the western border of Capoose Meadow, owned a farm since known as the Tripp Place, north of Hyde Park, whose margin was watered by a small nameless rivulet. From a vein of coal brought to light by the receding waterfall, near where the Mount Pleasant Colliery is now [1880] located, Mr. Taylor gathered a few lumps for a fire in his kitchen in the Autumn of 1810, but two years later than its introduction into a grate in Wilkes Barre [by Jesse Fell]." (*Hollister*, unpublished 1880 history of the D&H, p. 4).

Hollister recounts an interesting story about Preserved Taylor and the lesson he taught some local folks who were taking his coal. Hollister's narrative about Taylor contains some interesting facts about the "mining" of surface coal. Here is what Hollister says:

"No powder or pick was necessary at first to secure the coal generally found upon the surface. A crow-bar or hand-spike and a peck basket, such as any farmer knew how to manufacture from ash saplings, constituted the entire mining machinery of the valley in 1810. / Mr. Taylor was a mild, apt old gentleman, full of old-fashioned hospitality and religious fervor [sic] whose plain log cabin, open to all, especially to the poor Methodist ministers occasionally itinerating their doctrines before every settler who would listen, became one of the most popular ones found in the neighborhood. No one turned from the generous threshold, even if drawn hither by curiosity, without carrying away a favourable impression of the glowing grate standing in his kitchen. Thus the fame of a coal fire gradually spread through the township, where grates became more familiar and fashionable. / Mr. Isaac Vaughn an old gentleman, who was born in Providence township in 1737 informed the writer that for many years after Mr. Taylor first used coal in his house, there was none sold in the country. Anyone who needed it would go the place where it was found in the creek or near it and take all he wanted without question, or even without thanking the owner, who cared nothing for it. This condition of things remained so for years without detriment or advantage to either party. At length, after Mr. Taylor had discovered that stone coal from the surface was inferior to that lying remote from the action of the air, he opened a mine into the bank for several yards. In spite of the remonstrances of the old gentleman, who could no longer force his commands by physical means, some of his neighbors continued to dig and carry away his coal without any offer of remuneration. In a quandary what to do in the matter, he consulted his neighbor, Stephen Tripp. 'Well"', replied Tripp, after he had listened to the complaints and inquiries of his friend, 'when we hunt wood-chucks we sometimes have to smoke 'em out.' / Taylor took the hint and returned to his home. Procuring from his well-filled

barn a few bundles of straw, he carried them to the mouth of his mine as four or five men ignorant of his intentions, were busily engaged in stealing his coal. Applying the fire brand to the bundles he tossed them into the low mouth of the mine, then retreated to watch the result. The novelty of the operation did not diminish its effects. In a few minutes out came the indignant, wood-chuck men, half smoked and suffocated, yet so improved by this heroic treatment that ever afterwards they all shunned the coal mine of Mr. Taylor." (*Hollister*, unpublished typescript, pp. 5-6)

Following the outbreak of the War of 1812, (by which America declared for the second time its political independence from Great Britain) and the blockade of Atlantic shipping by the British (with 600 ships, while the U. S. had just 17, including the USS Constitution "Old Ironsides"), it was no longer possible to import bituminous coal from England or to procure it from the bituminous fields of Virginia for manufacturing purposes in Philadelphia which, at the time, regarded itself as "the Athens of America."

By 1814, America's first energy "crisis" was in full swing in Philadelphia and in other large cities in the northeast, where there was not enough fuel available to carry out manufacturing. As a result of the War of 1812 and the development of the anthracite coal industry in northeastern Pennsylvania, America would emphatically become economically independent of Great Britain, as well. Interestingly, in 1812, in Philadelphia, at the same time, America also declared its intellectual independence from Great Britain when a small group of naturalists met and founded the Academy of Natural Sciences.

William and Maurice Wurts, knowledgeable and successful entrepreneurs and businessmen in the dry goods business in Philadelphia at the time conceived the idea of using "stone coal" as a fuel—instead of bituminous coal, charcoal, or wood—for manufacturing purposes. Reports at the time indicated that deposits of stone coal were known to exist in northeastern Pennsylvania.

The Wurts Brothers and their Encounter with David Nobles

From 1812 to 1814, the Wurts brothers, William in particular, roamed the Poconos and the upper Lackawanna Valley looking for coal lands.

Their expectations were not realized, and they were discussing the propriety of abandoning that field of search and of turning their attention to localities farther south in the valley, when one day, while prospecting near where the city of Carbondale now stands, Maurice Wurts came upon a man dressed as a hunter hiding in a thicket. Wurts learned that the man was David Nobles and that he was living in the woods to escape imprisonment for a debt which he owed a man in Wayne County.

Imprisonment for a debt? In 1812, David Nobles, a woodman from South Canaan township, owed \$15 to a man from Canaan Township named Goodrich, who refused to accept a deed for a tract of land owned by Nobles in payment of the \$15. Goodrich, in 1814, got a judgment against

Nobles, who fled to the wilderness to escape imprisonment for debt. (The law of imprisonment for debt was repealed in 1834.)

Here is Clark's description of the David Nobles/Wurts Brothers encounter:

"While searching up and down the Lackawanna he came across a hunter, named David Nobles, familiar with places where black stones could readily be pointed out. The State of Pennsylvania had not at this time withdrawn its prerogative of imprisonment for debt, and Daniel [sic] Nobles, struggling in vain with poverty, being threatened for a trifling debt by an extortionate neighbor in the adjoining county of Wayne, fled to the woods with his gun to avoid the officer and jail. Mr. Wurts found him rambling over Ragged Island, heard his pitiful tale, and, after replenishing his purse to the extent of the liability, employed him to hunt coal and bring knapsacks of provisions over the mountain from the township of Canaan, in Wayne County, where a few farmers seemingly prospered. He became during the summer months, the inseparable companion of the pioneer, sounding his way up the windings of the Lackawanna. / After the discovery of vast bodies of coal upon lands, the possession of which was essential in maturing the original purpose, Mr. Wurts used Nobles as an agent in securing good purchases, because of his rough exterior, in order to avoid the suspicion that any capitalists were endeavoring to control vast quantities of acres, so prejudicial was the narrow minded yeomanry at that early date of monopoly, of anything that looked like an innovation. / By such artifices, honorable as ingenious, Mr. Wurts secured control of several thousand acres of coal lands in the county of Luzerne, in the year 1814. The cost of the soil at this time was but fifty cents to three dollars per acre. The average value at the present time ranges from \$1,000 to \$2,000 per acre. The giant timber spread over it was of no account, and much of it upon the site of Carbondale was felled and burned away to prepare it for the reception of the cabins of the workmen. These purchases included the region where Carbondale and Archbald are located, with a portion of the intervening land, and a small section in Providence, on the Anderson farm, above Cobb's Gap, where in 1814, he opened the seven and nine feet veins of coal to obtain specimens for exhibitions in Philadelphia, New York, and other sections of country. . . (Clark, p. 133)

The following very interesting account of the Wurts/Nobles encounter was published in the December 12, 1898 issue (p. 6) of the *Carbondale Leader*:

"EARLY DAYS OF THE D. & H. / How the Company Came Into Existence—About Two of Its Prominent Pioneers. / The New York papers contained articles yesterday concerning the tunneling of the Moosics near Hollenback station and in commenting on the articles today the Scranton papers express the belief that nothing will ever come from the project. The reason given by them is that it would not pay to transfer the coal from cars to boats at Rondout. They forget that the double track West Shore railroad is prepared to take from that point direct to New York all freight that may be consigned to it. / **A REMINISCENCE. /** A resident of Wayne county writing to the Sun says it was due to a romantic incident that the Delaware & Hudson canal company came into existence. This romance began in the township of South Canaan, near the

border of the unbroken wilderness that covered all the Lackawanna valley then above the little settlement where the city of Scranton now is. David Nobles, a woodman of that township, had got into debt [in 1812] to a man named Goodrich [a neighbor in Canaan Township] to the amount of \$15. Nobles held title to a tract of wild land in the Lackawanna valley. That land is now part of the site of the city of Carbondale. The debtor refused to accept a deed of the tract in payment of the \$15, and got judgment against Nobles, who fled to the wilderness to escape imprisonment for debt. This was in 1814. Since 1812 the two Wurts brothers, Philadelphians, who were among the earliest believers in the futures of anthracite coal, had been prospecting all over that wilderness for signs that would warrant them in getting possession of land overlying coal deposits, their idea being to locate mines near the tributaries of the Delaware river, so that the Delaware might be used as the highway to transport the product to Philadelphia. / TURNED BACK. / Although confident that coal existed in that part of the Lackawanna valley, they made no discovery that promised a realization of their hopes, and they at last determined to abandon that field and continue their quest for coal in the southern part of the Lackawanna valley. William Wurts had actually left the valley and returned to Philadelphia, and his brother Maurice had turned his face southward, after making a final search for coal, near the present site of Carbondale, when he came suddenly upon a man in the garb of a hunter, who was making efforts to conceal himself in a thicket. Wurts, supposing the man was some mountain hermit, addressed him, soon quieted his fears, and engaged him in conversation. The hunter proved to be the fugitive Dave Nobles, who told Wurts why he was thus hiding in the wilderness. Thinking that perhaps this woodman might have at some time seen anthracite coal in his wanderings, Wurts questioned him on the subject. Nobles said that he had a tract of land nearby where there were curious black stones, and if they were coal he knew where there was abundance of them. Wurts offered to buy the tract right there and then and asked Nobles what he would sell it for. / 'If you will pay old Goodrich the \$15 that I owe him, so that I can go home once more,' replied Nobles, 'I'll give you a deed for the lot.' / Wurts lost no time in satisfying the judgment against Nobles, and the land he obtained for that outlay is known as the Grassy Island tract, where the first coal mine in the Lackawanna Valley was put down, and out of which enough coal was taken to pay the entire cost of the canal and railroad that transported the product to market. So it may truthfully be said that if Dave Nobles had been able to pay his debt of \$15 to Goodrich, instead of having to flee to the wilderness to escape imprisonment, there wouldn't have been any Delaware and Hudson Canal company, with its millions upon millions of property. . . (*Carbondale Leader*, December 12, 1898, p. 6)

Having acquired the land owned by David Nobles, which is identified as the 'Grassy Island tract' in the article cited immediately above, the Wurts brothers then employed Nobles to help them acquire additional coal lands. This initial land acquisition by the Wurts brothers, their encounter with David Nobles, their subsequent land acquisitions with the assistance of David Nobles, and the early years of the history of the D&H are described in an article that was published in *The Journal* of September 1, 1887, p. 3:

"THE DEL. & HUD. COMPANY. / How the Canal and Railroad Came to be Built--Interesting Coal History. / Wilkes-Barre News Dealer Aug. 22. / The Delaware and Hudson Canal Company owns and controls the Lackawanna coal field from Carbondale to the upper suburbs of Scranton absolutely, but if old Dave Nobles had not run in debt to a neighbor in Canaan township, Wayne county, to the amount of [British sterling pounds sign] 3 in 1812, and then ran away to escape imprisonment because he was unable to pay the debt, there is a great question whether there would have been any Delaware and Hudson Canal Company to day. / In 1812 the valley was almost entirely uninhabited from Wilkes-Barre to the northeastern border of the State. In spite of all the efforts of enterprising and enthusiastic individuals in what is now known as the Lehigh coalfield, people had not yet been induced to look on anthracite as a fuel. The subject was being agitated, however, and those who believed in the coal foresaw a great future for it as article of commerce. Among those whom were firm believers that anthracite was destined to be the fuel of the future were Maurice and William Wurts, two Philadelphia merchants of means. They believed that they would exercise great wisdom in getting possession of as much coal land as possible. All investigations and explanations on the subject had previously been made in the Lehigh and Lower Luzerne and Schuylkill regions, the idea being that the Lehigh river would afford cheap and feasible means of transportation for coal to market when a demand had been created for it. Philadelphia was the objective point of all the early anthracite coal operators. The Wurts brothers, however, pushed into the wilderness of the Upper Lackawanna to do their prospecting for coal. Their idea was to get possession of tracts near the tributaries of the Upper Delaware--the Moosic Mountain being the dividing line between the Delaware and Susquehanna [north branch of the Susquehanna] drainage--so that that stream might be used as the highway to transport the product of their prospective mines to Philadelphia. / Previous to the war of 1812, the bituminous coalfields of England and Virginia had supplied the demands of this country for fuel of that kind. This supply being largely reduced by the war, the attention of consumers was turned in other directions, a circumstance that more than any other hastened the introduction of anthracite into general use. The Wurtses appreciated the opportunity the times presented, and from 1812 to 1814 they roamed the Upper Lackawanna Valley looking for coal lands. Their expectations were not realized, and they were discussing the propriety of abandoning that field of search and of turning their attention to localities further south in the valley, when one day, while prospecting near where the city of Carbondale now stands, Maurice Wurts [b. 1783 in Flanders, NJ, d. 12-29-1854, in Philadelphia, at age 72] came upon a man in the garb of a hunter who was trying to conceal himself in a thicket. Wurts, supposing the man was a hermit, addressed him, and by questioning, learned that his name was David Nobles, and that he was living in the woods to escape imprisonment for a debt which he owed a man over the line in Wayne county. / During the conversation Wurts, hoping that this man, who evidently was familiar with every rod of the wilderness in that locality, had at some time seen anthracite coal deposits, made inquiry of Nobles on the subject. Nobles replied that he owned a lot near there [possibly the land, 1203 acres, acquired by Nobles on 09-22-1814] where he had noticed some peculiar black stones, and if those stones were coal he knew where there was plenty of it. / 'How much do you want for your lot?' asked he Quaker. / 'If you will pay off my debt of [pounds sign] 3,' replied Nobles, 'I will give you a deed for the lot.' / Wurts lost no time in releasing Nobles

from the debt and in getting title to the land. And he did not stop there. He employed Nobles to guide him to different localities in the valley where coal could be found. It was found in vast tracts from Ragged Island where Wurts had discovered the fugitive hunter, for sixteen miles down the valley. The different tracts, except one known as the Anderson Farm, now in the city limits of Scranton, belonged to a wealthy landowner who lived in Sunbury. Fearing that if he applied in person to the proprietor and opened negotiations for the purchase of the property the latter might suspect that there was something of more value than the land that would influence a staid and distinguished-looking Quaker to seek investment in the unproductive wilderness, and that the owner might either decline to sell or to set a large price upon the property, the crafty Philadelphian hit upon an ingenious plan to disarm suspicion. / Taking Nobles to Sunbury with him, he instructed him what to do. Nobles called on the owner of the lands, and representing himself as one of several brothers who desired to engage in farming on a large scale somewhere on the frontier where extended tracts of land could be obtained at small cost, asked him his terms for his wild lands. A price was named and agreed upon, and none of the land was valued at more than \$3 an acre, while some of it was rated at 50 cents, the average price for the tracts being less than \$2 an acre. Then Nobles sent for his 'friend Wurts,' who appeared on the scene [Dr. Hollister says that this land acquisition took place in 1814], advanced the money, and had the deeds made out in his name. [Possibly these lands acquired at Sunbury were the lands referred to in the Nobles deed dated Aug. 22, 1816, from William Russell; Nobles buying the land at Sunbury and immediately conveying it to Wurts] All the valuable coal lands owned by the Delaware and Hudson Canal Company between Carbondale and Providence, the northern ward of the city, except the Nobles tract [which Wurts got from Nobles for paying off the three pound debt] and property known as the Anderson Farm, was obtained in that way. / The idea of the Wurts brothers that they would find coal lands far enough north to enable them to run their product to market by the way of head tributaries of the Delaware they found to be incorrect [the coal lands did not abut the Delaware, in other words], as the deposit of anthracite did not extend beyond the hills bordering the Lackawanna Valley. They then looked about for other means of reaching the Delaware. Nine miles from their 'mine' on the Anderson tract they found a creek of considerable size, now known as Jones' Creek. It emptied into the head waters of the Wallenpaupack Creek, a large tributary of the Lackawaxen River, the latter being one of the main feeders of the Upper Delaware. The distance from the mouth of Jones' Creek to the mouth of the Wallenpaupack was twenty miles. From there to the Delaware, at the mouth of the Lackawaxen, was sixteen miles. From there to Philadelphia the distance was about 200 miles. It was by this devious and treacherous route that the Wurtzes determined to run the first cargo of coal from the Lackawanna Valley to market. / During the entire summer of 1815, David Nobles was kept busy removing obstructions from the channel of Jones' Creek, and in making himself familiar with the stream and its channel. On the first fall of snow two sledloads of coal, taken from the veins on the Anderson Farm, were hauled through the woods by ox team to the creek. The coal was then loaded on a raft of dry pine trees. David Nobles was to pilot this pioneer cargo to Wallenpaupack. The creek was high, and all went well for a mile, when the raft was wrecked on a bottom rock, and the cargo went to the bottom. Nobles narrowly escaped drowning. / The result of all the work the Quakers had done convinced them that they would not be able to supply

with coal by the Jones' Creek route, and they went to work at once to lay out a different one. Abandoning operations at the Anderson Farm, they opened what they called a mine on the lot they received from David Nobles on Ragged Island. From this lot they cut a road through the woods to a point on the Wallenpaupack Creek. The road was twenty miles in length. They hauled two loads of coal to the bank of Wallenpaupack Creek and loaded it on rafts. These were run safely down the Wallenpaupack. A mile and half above the mouth of the stream the water plunges [at Hawley] down a precipice more than 150 feet. At that point the coal was taken from the rafts and hauled around the falls to the Lackawaxen River, at Paupack Eddy, where the village of Hawley now stands. There it was placed on arks built for the purpose, and started on its way to Philadelphia, via the Delaware. One of the arks was wrecked before it reached the Delaware River. The other was run safely to Philadelphia. / The mode of getting coal to market was so expensive that the Wurtzes found it necessary to secure still another route. They made a road from their mine on the Nobles lot, now Carbondale, over the Moosic Mountain to the Lackawaxen River at a point near the present village of Honesdale, a distance of twenty miles. They erected a rude mining apparatus at their mine, but shipped no more coal until 1823. In that year they mined 2,000 tons of coal and intended to haul it to the Lackawaxen River the following winter. There was but a slight fall of snow that year, and only 100 tons could be transported over the mountain. That quantity was run safely to market in the arks and was disposed of in Philadelphia at \$12 a ton. This was a remunerative price, and if navigation on the Lackawaxen River, which is a rough and turbulent stream, could be made secure, the Wurtzes believed they had solved the problem that was then agitating those who were interested in anthracite. / Maurice Wurts accordingly obtained authority from the Pennsylvania Legislature to improve the channel of the stream. The efforts of the operators in the Lehigh and Schuylkill coal regions had by this time been crowned with success, however, and by the shorter distance from their mines to Philadelphia, they were able to put coal on the market there at half the price the Wurtzes could possibly furnish theirs for from their far northern mines. The lower operators transported 6,000 tons to Philadelphia in 1823. This destroyed all hope the Quaker operators had of finding a sale for their coal in Philadelphia, and they began seeking for means to reach New York as their market. They conceived the idea of connecting the Lackawanna Valley with that of the Hudson by railroad and canal. / William Wurts walked the entire distance from the mines to the Hudson to gain an idea of the feasibility of such a project. The result was the conception of the present Delaware and Hudson Canal from Honesdale to Rondout, and the gravity railroad over the Moosic Mountain from the mines to connect with the canal. In 1824 the Wurtzes obtained a charter from the Pennsylvania Legislature for the Lackawaxen and Delaware Canal and Railroad, and from the New York Legislature for the Delaware and Hudson Canal. In the face of the most gigantic difficulties, the then greatest engineering project of modern times was pushed by the two indomitable brothers to completion, and in 1828 the first cargo of anthracite coal that was ever received in New York city from the mines direct was transported from Carbondale by the first long coal railroad and the greatest canal every built with private means in this country. / The coal was taken from the Dave Nobles lot, which had cost [pounds sign] 3, and which has alone yielded millions to its owners. To the accommodating spirit, therefore, of the neighbor who let Dave Nobles get into his debt, the inability of Nobles to pay it, and the then existing debtor laws of Pennsylvania, it may truly be said that the Delaware and Hudson Canal Company owes its existence to-day." (*The Journal*, September 1, 1887, p. 3). This same article was printed in *The New York Times* of July 30, 1887.

Durfee on the question of land titles to coal lands:

"Land Titles, and J. W. Johnson and W. P. Miller. / by J. B. DURFEE. / All the lands for miles north and south of Carbondale were formerly owned by Lord John Russel, of England, and J. R. Priestly, an Englishman of Northumberland, Pennsylvania, was his agent for the sale of the lands. The reason for their being so many fancy names to the various tracts was that the government did not want the lands to be monopolized by any one person, but sold to actual settlers; so that it had to be taken under different titles, such as Susan Diller and other fictitious names. The tracts were surveyed and laid out in lots of 400 acres, with 60 acres allowed for roads and highways, and sold at the nominal price of four dollars per acre. I believe there was no reservation on coal until some years after the Delaware & Hudson Company bought, built and started their works. What they paid for theirs I do not know, but probably not more than four dollars per acres. James W. Johnson came in about this time and purchased a large tract, now owned by G. W. Morss, for four dollars per acre, where he soon built a saw mill and tannery; also a large dwelling and boarding house, being right in the midst of a dense forest of hemlock timber for his mills and bark for his tannery. The greatest drawback to his business was the want of a road to Carbondale. He had no other way to go than to go by way of the foot of No. 3 plane; a tremendous hill to go over both ways and bad roads at that. [There was no road at the time between Simpson, where the Morss tannery was located, and Carbondale. So, one had to go up the hill through Simpson to White's Crossing, which is where the foot of Plane No. 3 was located, and go from there down the turnpike road to Carbondale.] After running his tannery some three or four years, it was burned while he was away from home. Johnson got his insurance and he re-built his tannery, but soon leased it to R. D. Lathrop. . . (*Carbondale Advance*, Saturday, April 18, 1874, p. 2; this complete article was included as Chapter XI in J. R. Durfee's *Reminiscences of Carbondale, Dundaff, and Providence Forty Years Past*, 1875, pp. 57-60 [The *Advance* gives Durfee's middle initial as B; the book as R]).

1822: Naming of Carbondale according to Hollister:

"Carbondale was named by Wurts [brothers] before a cabin was erected upon its site. The name was never suggested or spoken until 1822 and then it was compounded in Philadelphia by these gentlemen from dale and carbon. D. Yarrington. Esq, an eccentric yet very intelligent old gentleman now living in Carbondale, was boarding upon the mountain in Rixe's Gap in 1822 when a lumber two-horse wagon loaded with tools, powder and camp-life paraphernalia driven by a weary and lonesome teamster stopped at the Mountain House which was known and used as an 'Inn' by the occasional wayfarer. The teamster upon whom devolved the duty of finding the unnamed place being asked where he was going with his strange load, replied, 'to Carbondale'. He did not know where that was nor did any one else, but the stuff forming his load was marked in prominent lettering 'Carbondale 143 miles from Philadelphia on the Lackawannock River, Luzerne County, Penn'a.' / Mr. Yarrington, knowing that some fellows credited with vague notions about stone coal had been digging in the woods down by the Lackawanna for some time, some three miles from the Mountain House, was able to direct the bewildered teamster to the camp ground under the hemlock, thus and then christened Carbondale." (*Hollister*, unpublished typescript, pp. 17-18)

The Wurts brothers then focused their energies on developing these "stone coal" fields. By the fall of 1822, they were quarrying coal in Carbondale, which at the time was a wilderness area. That winter, they were able to transport to Philadelphia, partly on sleds and partly on rafts on the Lackawaxen and Delaware rivers, about one hundred tons of anthracite coal, which they are reported to have sold for between ten and twelve dollars a ton.

As early as 1820, however, other entrepreneurs, with coal fields closer to Philadelphia than those owned by the Wurts brothers, had by that time (1823) already established a foothold in the Philadelphia coal market. Not to be discouraged, the Wurts brothers decided to find another market for their coal. That market, they concluded, would be the city of New York.

To transport their coal to New York, the Wurts brothers would use a canal and a railroad. They then undertook the necessary legislative and legal proceedings to make that transportation system a reality.

Legislative acts, passed on the following dates, made that transportation system a reality:

1. March 13, 1823: see pages 34-45
2. April, 23, 1823, see pages 45-61
3. April 7, 1824, see pages 61-67
4. April 1, 1825, see pages 67-69
5. April 5, 1826, see pages 70-71

1. On March 13, 1823: the legislature of Pennsylvania authorized Maurice Wurts and others to canalize the Lackawaxen River: (Pennsylvania, Laws of 1823, Chap. 61. An Act To Improve The Navigation of the River Lackawaxen).

In Section 1 of this statute, Maurice Wurts and associates were given the authority to establish a complete slack water navigation (descending/ascending) in the Lackawaxen River itself:

"Sec. 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, That it shall and may be lawful for Maurice Wurts, of the City of Philadelphia, his heirs and assigns, with his or their surveyors, engineers, superintendents, artists, and workmen to enter upon the river Lackawaxen, and any one of the streams emptying into the same that may appear to the said Maurice Wurts, his heirs or assigns, most suitable for the purposes contemplated by this act, to open, enlarge or deepen the same, in any part or place thereof, . . . from or near Wagner's Gap, in the county of Luzerne, or from or near Rix's Gap, in the county of Wayne, to the mouth of the said river Lackawaxen, with a channel not less than twenty feet wide and eighteen inches deep, for arks and rafts, and of sufficient depth of water to float down boats of the burthen of one hundred barrels, or ten tons. . . / *Provided*, That no toll shall be demanded for any boat, vessel, or craft in ascending said stream of water, unless the same is converted into a complete slack water navigation, as is authorized by this act."

Section 18 of this act is the well known "right of resumption" section of this statute, which would be an important question in 1853 (1823 + 30 years). Here is that section in its entirety:

"Sec. 18. And be it further enacted by the authority aforesaid, That at the expiration of thirty years from the passage of this act the said Maurice Wurts, his heirs or assigns, shall render, under oath or affirmation, to the legislature, an exact account of the amount of money expended by them in making said navigation and in keeping the same in repair, and also of the amount of tolls received by them during that time. And if it shall thereupon appear that the tolls during that time have amounted to so much above six per centum per annum on the amount of moneys so expended in making and keeping in repair said navigation, as will be equal to the capital sum so expended, then the legislature may resume all the rights, liberties and franchises hereby granted; but if it shall appear that the tolls during that time have not amounted to so much above six per centum per annum on the money so expended in making and in keeping in repair said navigation, as will be equal to the capital sum so expended, then it shall be lawful for the legislature, on payment to the said Maurice Wurts, his heirs or assigns, of the difference or deficiency, to resume all the rights, liberties, and franchises hereby granted; and in case of such resumption the legislature shall be bound to fulfill all and singular, the obligations enjoined by this act on the said Maurice Wurts, his heirs or assigns. And if neither the descending nor the slack water navigation authorized by this act, shall be completed within ten years from the passage thereof, then the legislature may resume all the rights, liberties and franchises hereby granted to the said Maurice Wurts, his heirs or assigns." It is interesting to note that there is no mention of William Wurts in this document.

Brother John Wurts (1792-1861; elected to the lower house of the Pennsylvania legislature in 1817, to the State Senate in 1820) surely was helpful, given his political connections, as was S. S. Benedict of Carbondale (see here, pp. 43-45) in getting the act incorporating his brother's company, named The Lackawaxen Coal and Navigation Company, passed by the Pennsylvania Senate. Given the importance of that legislative act in the history of the mining and transportation system that was conceived and launched by Maurice and William Wurts, it is well to here present the complete text of that act of the Pennsylvania legislature.

Here is the text of that March 13, 1823 act of the Pennsylvania legislature:

PENNSYLVANIA

CHAPTER 61. LAWS 1823.

AN ACT TO IMPROVE THE NAVIGATION OF THE RIVER LACKAWAXEN.

SEC. 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, That it shall and may be lawful for Maurice Wurts, of the City of Philadelphia, his heirs and assigns, with his or their surveyors, engineers, superintendents, artists, and workmen to enter upon the river Lackawaxen, and any one of the streams emptying into the same that may appear to the said Maurice Wurts, his heirs or assigns, most suitable for the purposes contemplated by this act, to open, enlarge or deepen the same, in any part or place thereof, in the manner which shall appear to them most convenient for opening, enlarging, changing, making anew, or improving the channel; and also, to cut, break, remove and take away all trees, rocks, stones, earth, gravel, sand, or other material, or any impediments whatsoever within the said river Lackawaxen and the branch thereof, which the said Maurice Wurts, his heirs and assigns, may select, and to use all such timber, rocks, stones, gravel, earth, or other material, in the construction of their necessary works, and to form, make, erect and set up any dams, locks, or any other device whatsoever which the said Maurice Wurts, his heirs or assigns, shall think most fit and convenient to make a good and safe descending navigation, at least once in every six days, except when the same may be obstructed by ice or floods, from or near Wagner's Gap, in the county of Luzerne, to, from or near Rix's Gap, in the county of Wayne, to the mouth of the said river Lackawaxen, with a channel not less than twenty feet wide and eighteen inches deep, for arks and rafts, and of sufficient depth of water to float down boats of the burthen of one hundred barrels, or ten tons: *Provided*, That no toll shall be demanded of any boat, vessel, or craft in ascending said stream of water, unless the same is converted into a complete slack water navigation, as is authorized by this act.

Maurice Wurts, his heirs and assigns, authorized to improve the navigation of the River Lackawaxen.

Powers.

Proviso relative to taking toll.

SEC. 2. And be it further enacted by the authority aforesaid, That if any person or persons shall be injured by means of any dam or dams being erected under the provisions of this act, or the land of any person shall be inundated by swelling the water by means of any dam or dams, or any mill or other water works injured by swelling the water into the tail race of any such mill or other water works, which may have been erected in the said river Lackawaxen, or the branch thereof which the said Maurice Wurts, his heirs and assigns, may use for the improvements authorized by this act; and if the said Maurice Wurts, his heirs and assigns, cannot agree with the owner or owners thereof as to the compensation to be paid for such injury, the same proceedings shall be had as is provided in the fourth section of this act; and the persons or jury valuing the damages, having been first sworn or affirmed, justly and impartially to assess the same, shall take into consideration the advantages which may be derived by such owner or owners from the navigation aforesaid, and if the owner of any such land, mill or water works shall be apprehensive that the same will be injured by any dam or dams then about to be erected by the said Maurice Wurts, his heirs or assigns, such owner may require the said Maurice Wurts, his heirs or assigns, to give to him sufficient security for the payment of any damages that may be thereafter awarded to him under the provisions of this act, for or by reason of injury arising to him from such dam or dams; and after such requisition shall have been made in writing, it shall not be lawful for the said Maurice Wurts, his heirs or assigns, to proceed in the erection of such dam or dams, until such security shall have been given; and if the parties cannot agree upon the amount and sufficiency of the security, the same shall be judged of by the Court of Common Pleas of the county in which such land, mill or water works may be situated.

Damages occasioned by the erection of any dam or dams, how settled.

AND WHEREAS, on examination, and survey, it may appear to the said Maurice Wurts, his heirs or assigns, practicable and expedient to make a slack water navigation between the points aforesaid:

Therefore

SEC. 3. Be it further enacted by the authority aforesaid, That it shall and may be lawful for the said Maurice Wurts, his heirs and assigns, if they shall think proper, to make a complete slack water navigation

Authorized to make a slack water navigation.

Powers and
privileges.

May enter in
and upon, and
occupy land,
&c., paying
damages.

Mode of ascer-
taining dam-
ages when
parties can-
not agree.

Duty of jury
and appraisers.

May enter
into and upon
lands to pro-
cure materials.

Damages, &c.,
how assessed.

from or near Wagner's Gap, aforesaid, or from or near Rix's Gap, aforesaid, to the river Delaware, at or near the mouth of the river Lackawaxen, so as to admit a safe and easy passage for loaded boats, arks and other vessels, up as well as down the said river Lackawaxen, and any one of the streams emptying into the same, which the said Maurice Wurts, his heirs or assigns, may deem most suitable for such navigation, or by means of such collateral sluices and locks as they may devise for the purpose. And for the purpose of making such slack water navigation, the said Maurice Wurts, his heirs and assigns, shall have and possess the same powers, privileges and authority as is given to them by the first section of this act, to enable them to make a descending navigation.

SEC. 4. And be it further enacted by the authority aforesaid, That whenever it shall be necessary for the said Maurice Wurts, his heirs or assigns, to enter in, and upon, and occupy, for the purposes of said navigation, any land which may be suitable and necessary for erecting a lock, sluice, canal, tow-path, or other device; if the owner or owners of such land shall refuse to permit such entry and occupation, and the parties cannot agree upon the compensation to be made for any injury, or supposed injury, that may be done to the same, it shall and may be lawful for the parties to appoint five suitable and judicious persons to estimate such damage, who shall be under oath or affirmation, fairly and impartially to estimate the same, and shall reside within the proper county where the land lies; But if they cannot agree upon such persons or if the owner of the land shall neglect or refuse to join in such appointment within twenty days after requisition for that purpose upon him made, or if such owner shall be *feme covert*, under age, *non compos mentis*, or out of the State; or if the persons, or a majority of the persons appointed by the parties shall not, within thirty days after receiving notice of their appointment, file a report of their estimate in the Prothonotary's Office of the Court of Common Pleas of the county where the land lies, then, and in either of these cases, either of the parties may apply to the Court of Common Pleas of the proper county where the land lies, and the said court shall award a *venire*, directed to the sheriff, requiring him to summon a jury of disinterested men, in order to ascertain and report, under their oaths or affirmation to the said court, what damages, if any, will be sustained by the owner or owners of said ground by reason of such lock, canal, sluice, tow-path, or other device passing through his, her, or their land, which report, on being confirmed by the court, shall be taken as the measure of damage in such case: *Provided*, that either party may appeal to the court within thirty days after such report may have been filed in the Prothonotary's office of the proper county, in the same manner as appeals are allowed in other cases, and the court shall direct an issue to be formed to try the fact. And it shall be the duty of the jury, or five appraisers, as the case may be, in valuing any land, or in estimating the damage that may be done to the same, to take into consideration the advantages that will arise to the owner or owners thereof, from the said navigation. And on payment by the said Maurice Wurts, his heirs or assigns, to the owner or owners of such land, of the sum awarded by the five appraisers, or by the report of the jury, or by final judgment on appeal from such report, as the case may be, then it shall be lawful for the said Maurice Wurts, his heirs or assigns, by themselves, their superintendents, engineers, artists or workmen, to enter in and upon and occupy such land for the purpose of said navigation, and there to dig, construct, make and erect such lock, sluice, canal, tow-path, or other device, as they may deem necessary.

SEC. 5. And be it further enacted by the authority aforesaid, That the said Maurice Wurts, his heirs and assigns, by and with their superintendents, engineers, artists, workmen and laborers, with their tools, instruments, carts, wagons and other carriages, and beasts of draught and burden, may enter upon the lands contiguous and near to the said river Lackawaxen, and the branch thereof which they may select for their improvements, giving notice to the owners or occupiers of such lands, and from thence take and carry away any stone, timber, gravel, sand, earth, or other material, doing as little damage thereto as possible, and repairing any breach they may make in the enclosures thereof, and making amends for any damages that may be done thereon, and paying for the materials so taken away, the amount whereof, if the parties cannot agree, shall be assessed and valued by any three disinterested free-holders residing in the neighborhood, under oath or affirmation, to be appointed by the parties, or if they cannot agree in their appointment, then to be appointed by any disinterested justice of the peace of the

proper county. And it shall be the duty of the said freeholders, to file a report of their assessment within seven days after they shall have agreed upon the same, with a neighboring justice of the peace, by whom the same shall be entered upon his docket; and the said freeholders shall, also, within the said seven days notify each of the parties, or the agent or attorney of the respective parties, of the name of the justice of the peace with whom their report has been filed, and either party may appeal from said report to the court of Common Pleas of the proper county, at any time within thirty days after the same shall have been so filed: *Provided, however,* That the owner of any stone, timber, gravel, sand or other material which the said Maurice Wurts, his heirs or assigns, may be about to remove as aforesaid, may require the said Maurice Wurts, his heirs or assigns, to give to him sufficient security for the payment of such valuation as may afterwards be put upon the same, or so much of the same as may be removed and appraised under the provisions of this section, and after such requisition shall have been made in writing, it shall not be lawful for the said Maurice Wurts, his heirs or assigns, to remove any of the said materials, until such security shall have been given, the amount and sufficiency whereof, if the parties cannot agree upon the same, shall be judged of by any disinterested justice of the peace of the township in which such materials may be situated.

SEC. 6. And be it further enacted by the authority aforesaid, That the said Maurice Wurts, his heirs and assigns, shall cause the guard walls, locks, gates and canal, to be erected and made at each respective situation, before the dam, intended for such situation, and to which the same are to be appurtenant, shall be extended into the stream so as to interfere with the rafting channel thereof.

SEC. 7. And be it further enacted by the authority aforesaid, That it shall be the duty of the said Maurice Wurts, his heirs and assigns, to make, construct and fix suitable and sufficient slopes and aprons, or other devices, at each and every dam which he or they shall or may erect under the provisions of this act, in such place and part of the channel of the stream, and in such manner as shall enable rafts of any description, that can now be run in the other parts of the stream, when the same is in good rafting condition, to pass with safety over such dam or dams. And in case the said Maurice Wurts, his heirs or assigns, shall neglect or refuse to make and fix such slope or slopes, apron or aprons, device or devices as aforesaid, at any dam or dams by him or them constructed as aforesaid, or shall for a term of nine months, after notice in writing, neglect or refuse to amend, repair or reconstruct any slope, apron or other device of their own construction, which shall or may have become out of repair, he, the said Maurice Wurts, his heirs or assigns, shall be liable to pay a fine not exceeding one hundred dollars, to be recovered before any justice of the peace of the proper county, to the use of such person or persons as shall have sustained damages by such neglect; and in case the said neglect shall be continued until the next court of quarter sessions, after the expiration of the said nine months, then and in such case the said Maurice Wurts, his heirs or assigns, shall be liable to prosecution by indictment for the same, and on conviction thereof, it shall be lawful for the court to order the dam or dams, where such neglect shall have occurred, to be pulled down, destroyed, and completely removed out of the rafting channel of the stream, and the expense incidental to the pulling down or removal of such dam or dams, shall be paid by the said Maurice Wurts, his heirs or assigns; and the service of process under the provisions of this section, upon the toll gatherer in the proper county, at or nearest to the place where the neglect shall have occurred, shall be as good and as available in law, as if served upon the said Maurice Wurts, his heirs or assigns: *Provided, however,* That this section shall not be construed to extend to or effect any dam or dams erected by the said Maurice Wurts, his heirs or assigns, at or above the highest point or place from which rafts can or do now run in the present natural or unimproved state of the river: *And provided further,* That this section shall not be so construed as to authorize boats, arks, craft or other vessels above the burthen of three tons laden with merchandise to evade the payment of the tolls fixed in this act, by passing over the slopes or aprons appurtenant to any dam.

SEC. 8. And be it further enacted by the authority aforesaid, That whenever any sluice or canal shall cross any public or private laid out road or highway, or shall divide the grounds of any person or per-

Either party
may appeal.

Security
for the pay-
ment of mate-
rials pre-
vious to their
being re-
moved.

Dams not to
be extended
into the
stream, until,
&c.

Slopes, aprons,
&c., to be con-
structed.

Penalty for
neglecting or
refusing to
construct or
repair slopes,
&c.

How recover-
able.

Court may di-
rect dams to
be pulled down
in certain
cases.

Process may
be served on
toll gatherer.

Proceedings
where a ford
or bridge may
be necessary.

sons, into two parts, so as to require a ford or bridge to cross the same, the appraisers or jury who shall inquire of the damages to be sustained in the manner directed by the fourth section of this act, shall find and ascertain whether a passage across the same shall be admitted or maintained by a ford or bridge, and on such finding the said Maurice Wurts, his heirs and assigns, shall cause a ford to be rendered practicable, or a bridge fit for the passage of wagons and carts, to be built and forever thereafter to be maintained and kept in repair, at all and every place or places so ascertained by the said appraisers and jury, at the cost and charges of the said Maurice Wurts, his heirs and assigns, but nothing herein contained shall prevent any person from erecting and keeping in repair, any foot or other bridge across any sluice or canal at his own expense when the same shall pass through his ground: *Provided*, That such foot or other bridges so to be erected by the owners of such land shall not interfere with any sluice or lock or other works of the said Maurice Wurts, his heirs and assigns.

M. Wurts, &c.,
entitled to use
the water
power.

SEC. 9. And be it further enacted by the authority aforesaid, That the said Maurice Wurts, his heirs or assigns, shall have the privilege and be entitled to use the water power from the said river Lackawaxen and the branch thereof which they may use for the making of the navigation authorized by this act, and from their sluices or canals to propel such machinery as they may think proper to erect on the land which they may previously have purchased from the owner or owners, or may sell in fee simple, rent, or lease for one or more years, the said water power to any person or persons, to be used in such manner and on such terms as they may think proper: *Provided*, It be done so that it shall not at any time impede or interrupt the navigation.

Descending
navigation.

When viewers
may be ap-
pointed and
license issued.

Toll shall
not exceed 3
cents per
mile, &c.

Slack water
navigation.

SEC. 10. And be it further enacted by the authority aforesaid, That as soon as the said Maurice Wurts, his heirs and assigns shall have completed ten miles of the descending navigation authorized by this act, and so from time to time as they shall complete other ten miles, they may give notice thereof to the Governor of the Commonwealth, who shall thereupon forthwith appoint three skillful, judicious and disinterested persons, having practical knowledge of river navigation, to view and examine the same, and to report to him in writing, under oath or affirmation, whether the said navigation is completed in the manner aforementioned, according to the true intent and meaning of this act, and if the report of them, or a majority of them shall be in the affirmative, then the Governor shall, by license, under his hand and the lesser seal of the Commonwealth, permit and suffer the said Maurice Wurts, his heirs or assigns, or such person or persons as they shall from time to time appoint as toll collectors, or their deputies, to demand and receive of and from the person or persons having charge of any boat, vessel, ark, craft, or raft passing through any lock in said navigation, such tolls and rates for every ton weight of the ascertained burthen of the said boat, vessel, ark, or craft, and for every one thousand feet, board measure, of boards, timber, plank or scantling, and for every ton weight of shingles, or other material in rafts, as the said Maurice Wurts, his heirs and assigns, may think proper: *Provided*, That the said toll shall not, in the whole, exceed the toll of three cents per mile for every ton of the ascertained burthen of such boat, vessel, ark or craft, and one-half that rate for every one thousand feet, board measure, of boards, timber, plank or scantling, and for every ton weight of shingles or other material in rafts: *And provided also*, That where any dam, erected by the said Maurice Wurts, his heirs or assigns, at any point or place now passable or used for rafting purposes in the present natural or unimproved state of the stream, shall not be so constructed by means of a slope or other device, as to afford a safe and convenient passage over the same for rafts of timber, boards, scantling or shingles, when the stream in other respects is in a good rafting condition, such rafts of timber, boards, scantling or shingles, if they do not carry some article of merchandise, shall be permitted to pass the locks appurtenant to such dam, free from toll.

SEC. 11. And be it further enacted by the authority aforesaid, That if, in pursuance of the authority herein given, the said Maurice Wurts, his heirs or assigns, shall determine to make a slack water navigation, then so soon as they shall have perfected one lock therein, and so from time to time as they shall perfect one additional lock they may give notice thereof to the Governor of the Commonwealth, who shall thereupon appoint three skillful, judicious and disinterested persons, having practical knowledge of

river navigation, to view and examine that part said to be completed, and report to him in writing, under oath or affirmation, whether the said navigation is so far executed in a masterly and workmanlike manner, according to the true intent and meaning of this act; and if at any time their report, or the report of a majority of them, shall be in the affirmative, then the Governor shall, by license, under his hand and the lesser seal of this Commonwealth, permit the said Maurice Wurts, his heirs and assigns, or such person or persons as he or they shall from time to time appoint as toll collectors or their deputies, to demand and receive of and from the person or persons having the charge of any boat, ark, vessel, or other craft, passing through any lock erected by them in the completion of said navigation, twelve and one-half cents upon each and every ton of the ascertained burthen of such boat, ark, vessel or other craft, and one-half of the same for every thousand feet board measure, of boards, timber, plank or scantling, and for every ton weight of shingles or other material in rafts: *Provided*, That where any dam, erected by the said Maurice Wurts, his heirs or assigns, at any point or place now passable or used for rafting purposes in the present natural or unimproved state of the stream, shall not be so constructed, by means of a slope or other device, as to afford a safe and convenient passage over the same for rafts of timber, boards, scantling or shingles, such rafts, of timber, boards, scantling or shingles, if they do not carry some article of merchandise, shall be permitted to pass the locks appurtenant to such dam free from toll: *And provided also*, That if, at the expiration of two years after said slack water navigation shall be completed, the tolls should enable the said Maurice Wurts, his heirs and assigns, after paying all repairs and other necessary expenses, to divide more than nine percentum per annum on the capital sum expended, then and in such case the tolls shall be so reduced that the dividends shall not exceed nine per cent. and shall so continue for five years; and if, at the expiration of that time, they shall exceed fifteen per cent., they shall be so reduced as not to exceed fifteen per cent., and shall at that period be so regulated from time to time, as not to exceed fifteen per cent. per annum; and if at any time after the expiration of two years from the completion of the said work the net profits aforesaid shall not amount to nine per cent. upon the money expended in the said work, it shall be lawful for the said Maurice Wurts, his heirs or assigns, to raise the said tolls, so as to divide nine per cent.

When viewers
may be ap-
pointed by
the governor.

And license
issued.

Rate of tolls.

Reduction
of tolls.

When they
may be raised.

SEC. 12. And be it further enacted by the authority aforesaid, That in order to ascertain whether any dam or dams, erected under the authority of this act, have been constructed in the manner contemplated by the seventh section of this act, and also by the second proviso to the tenth, and the first proviso to the eleventh section of this act, it shall be the duty of the court of Common Pleas of the county in which any dam may be situated, on complaint of any citizen to said court, setting forth that such dam is not so constructed as to afford a safe and convenient passage over the same for rafts of timber, boards, scantling or shingles, to appoint three reputable, judicious and disinterested persons to view and examine the same, and to report to the said court in writing, under oath or affirmation, whether the dam so complained of, is or is not so constructed as to afford a safe and convenient passage over the same for rafts of timber, boards, scantling or shingles; and if their report, or the report of a majority of them shall be in the affirmative, then it shall be lawful for the said Maurice Wurts, his heirs and assigns, to demand and receive from the person or persons having charge of any raft of timber, boards, scantling or shingles, passing through the lock appurtenant to such dam, toll according to the rate above established; but if their report or the report of a majority of them shall be in the negative, then such rafts of timber, boards, scantling or shingles, unless they carry some article of merchandise, shall be permitted to pass through the locks appurtenant to such dam, free from toll, until the same be made passable for rafts in the manner contemplated by the provisos above mentioned. And it shall be lawful for the said Maurice Wurts, his heirs or assigns, to apply in like manner, at all times, to the court of Common Pleas of the proper county, for the appointment of viewers, and upon such application, the like proceedings shall be had as are above directed, upon the application and complaint of any citizen.

Proceedings in
case the dams
are not con-
structed agree-
ably to this
act.

SEC. 13. And be it further enacted by the authority aforesaid, That in order to ascertain the size of arks and rafts and the tonnage of boats, using and passing the said navigation, and to prevent disputes

Mode of ascer-
taining and
marking the
size of rafts
and tonnage
of boats.

between the supercargoes and collectors of tolls concerning the same upon request of the owner, skipper or supercargo of such boat, raft or ark, or of the collector of said tolls, at any lock upon the said navigation, it shall and may be lawful for each of them to choose one skillful person to measure and ascertain the size of said raft or ark, and the tonnage the said boat is capable of carrying, and to mark the said tonnage so ascertained in figures, upon the head and stern of said boat, in colors mixed with oil or other durable matter, and the said boat or vessel, so measured and marked, shall be permitted to pass through the said locks for the price to which the number of tons, so marked on her, shall amount, agreeably to the rates fixed in the manner aforesaid; and if the owner, skipper or supercargo of any ark, raft or boat shall decline choosing a person to ascertain the tonnage thereof, then the amount of such tonnage shall be fixed and ascertained by the person appointed for that purpose by the said Maurice Wurts, his heirs or assigns, or chosen by the said collector of tolls, and the tolls shall be paid according to such measurement, before any such raft, ark or boat shall be permitted to pass the place where such toll is made payable.

Proceeding in
case the own-
ers, &c., de-
cline choosing,
&c.

Penalty for im-
pending navi-
gation or injur-
ing any lock,
&c.

Dimensions of
the locks.

Duty of
master, &c.,
to blow a
trumpet.

Duty of the
keepers of
the locks.

Penalty for not
raising locks.

Penalty for
not keeping
dams, &c., in
repair, and not
removing
obstacles.

How recovered
and payable.

Penalty on
owner, skip-
per, &c., for
passing locks,
&c., without
paying tolls.

SEC. 14. And be it further enacted by the authority aforesaid, That if any person or persons shall wilfully and knowingly do any act or thing whereby the navigation shall be impeded, or any dam, lock, gate, canal, engine, machine, property or device whatsoever thereunto belonging, shall be injured or damaged, he, she, or they so offending, shall forfeit and pay to the said Maurice Wurts, his heirs and assigns, four times the amount of the damages by them sustained, together with costs to be recovered by action of debt before a justice of the peace, or in any court of competent jurisdiction.

SEC. 15. And be it further enacted by the authority aforesaid, That the locks shall be, in the clear, at least eighteen feet wide, and sixty-four feet in length; and it shall be the duty of the master or commander of any boat, ark or other vessel passing said navigation, when he shall arrive within one-fourth of a mile from any lock so erected, under the penalty of two dollars, to blow a trumpet or horn, whereupon the keeper of such lock shall attend for the purpose of opening the gate or sluice to let the said boat, ark or other vessel pass without unnecessary delay, and in safety; and if any boat, ark, or other vessel shall be prevented from passing up or down any of said locks, or sluices, by reason of the lock not being raised for more than thirty minutes, the said Maurice Wurts, his heirs and assigns, shall, on conviction thereof, before any justice of the peace of the proper county, forfeit and pay to the person so hindered, the sum of one dollar for every thirty minutes beyond the said time, that he shall be so prevented, and in the same proportion for any longer or shorter time, and the service of any civil process upon the toll gatherer in the proper county, and next to the place where the offence shall have been committed, shall be held as good and as available in law as if served upon the said Maurice Wurts, his heirs and assigns.

SEC. 16. And be it further enacted by the authority aforesaid, That if the said Maurice Wurts, his heirs or assigns, shall neglect or refuse to keep in repair and good order, any dam, lock or sluice of their own construction, or shall neglect to remove any obstacle which may occur, so that boats, arks, rafts or other vessels may safely use said navigation in the manner provided by this act, the said Maurice Wurts, his heirs and assigns, shall for every such offence, forfeit and pay the sum of one hundred dollars, to be recovered in the same manner as debts of equal amount are by law recoverable before a justice of the peace of the proper county where the offence shall be committed, one-half to the use of the informer, and the other half to the use of the poor of the township or county where the neglect may occur, and the service of process upon the toll gatherer in the proper county, and next to the place where the offence shall have been committed, shall be held as good and as available in law as if served on the said Maurice Wurts, his heirs or assigns: *Provided*, That the payment of such penalty shall not be taken to exempt the said Maurice Wurts, his heirs and assigns, from their responsibility to any person who may be injured by such refusal or neglect.

SEC. 17. And be it further enacted by the authority aforesaid, That if any owner, skipper, or supercargo of any boat or ark, craft or raft, shall pass by any place appointed for receiving tolls, without mak-

ing payment thereof according to the provisions of this act, and with intent to defraud the said Maurice Wurts, his heirs and assigns, out of such toll, he, she or they so offending shall forfeit and pay for every time they shall so pass by each appointed place, to the said Maurice Wurts, his heirs and assigns, the sum of twenty dollars, to be sued for and recovered by action of debt, before any justice of the peace, How recovered.

SEC. 18. And be it further enacted by the authority aforesaid, That at the expiration of thirty years from the passage of this act the said Maurice Wurts, his heirs or assigns, shall render, under oath or affirmation, to the legislature, an exact account of the amount of money expended by them in making said navigation and in keeping the same in repair, and also of the amount of tolls received by them during that time. And if it shall thereupon appear that the tolls during that time have amounted to so much above six per centum per annum on the amount of moneys so expended in making and keeping in repair said navigation, as will be equal to the capital sum so expended, then the legislature may resume all the rights, liberties and franchises hereby granted; but if it shall appear that the tolls during that time have not amounted to so much above six per centum per annum on the amount of money so expended in making and in keeping in repair said navigation, as will be equal to the capital sum so expended, then it shall be lawful for the legislature, on payment to the said Maurice Wurts, his heirs or assigns, of the difference or deficiency, to resume all the rights, liberties and franchises hereby granted; and in case of such resumption, the legislature shall be bound to fulfill all and singular, the obligations enjoined by this act on the said Maurice Wurts, his heirs or assigns. And if neither the descending nor the slack water navigation authorized by this act, shall be completed within ten years from the passage thereof, then the legislature may resume all the rights, liberties and franchises hereby granted to the said Maurice Wurts, his heirs or assigns.

When, and under what conditions the legislature may resume all the rights and liberties granted by this act.

[Repealed April 30, 1852.]

Navigation to be completed in ten years.

JOSEPH LAWRENCE,
Speaker of the House of Representatives.

WILLIAM MARKS, JR.,
Speaker of the Senate.

APPROVED—the thirteenth day of March, one thousand eight hundred and twenty-three.

JOSEPH HESTER.

The charter privileges that were granted to Maurice Wurts in 1823 were to revert to the state in 30 years, as we mentioned above. In 1853 the Pennsylvania Legislature extended those privileges to the D&H in perpetuity:

Here is what *Mathews* (p. 244) has to say on the "Right of Resumption," as provided for in Section 18, above: ". . . the State of Pennsylvania reserved the right after the expiration of thirty years to resume the rights, liberties and franchises, on certain terms and conditions specified in the eighteenth section. The subject became one of considerable discussion in the Legislature as the expiration of the period, on March 13, 1853, approached, and on the 8th of January, 1852, the committee of the House to whom the matter had been referred reported that if the State did exercise its right of resumption, it must pay the company for the Pennsylvania section of the canal the sum of \$1,246,437.63, that being the difference between the amount of tolls received and the cost of construction and repairs. In this conclusion the board of managers did not concur,

but on the contrary they argued that even if the right of resumption, by the State, did exist, the amount paid must be much larger. Finally, on the 30th of April, 1852, a bill was passed which was in effect a total and unconditional surrender by the State of its right of resumption, if any such she had, and a perpetual extension of the franchises of the company."

1853: The Pennsylvania legislature extended the charter privileges of the D&H in perpetuity. (The charter privileges granted to Maurice Wurts in 1823 were to revert to the state in 30 years. In Hollister's unpublished typescript of 1880, p. 34, we read: "[The franchise] to improve the navigation of the Lackawaxen River, extended for thirty years, 1823-1853]. It was renewed in 1853 and by the adroit management of Hon. S. S. Benedict, of Carbondale, made perpetual.")

This question of charter renewal is discussed in detail by Hollister in Chapter XVII of his unpublished typescript, dated 1880. Here is Hollister's very interesting commentary (pp.133-39) on Section 18 of this statute:

"Chapter XVII. Expiration and Renewal of the Charter of the Delaware & Hudson Canal Company in 1853. Hon. S. S. Benedict. / The original Charter of this Company in New York was made perpetual; in Pennsylvania it contemplated an existence of but thirty years from March 13, 1823, by the 18th Section of the Act entitled "An act to improve the navigation of the River Lacakwaxen," approved at that time by Governor Joseph Heister of Pennsylvania. / [Hollister then gives Section 18 of this act.] / The North Eastern Portion of Pennsylvania, now comprising the Counties of Pike, Wayne and Lackawanna, was comparatively a wilderness, when Maurice Wurts asked legislative franchises from its Legislature in 1822-3. / Title to this wild territory was not yet vested in the State. It acknowledged the jurisdiction of a commonwealth unwilling to accord any consideration to the few plain farmers and lumber men inhabiting it, and yet, when Wurts solicited official permission to tranquilize [I wonder if Hollister wanted to use the words 'canalize'?] the Lackawaxen River for coal or canal purposes he was compelled to accept the illiberal provision of expiration or extension of Charter in March 1853. This Section in the Act was the result of Lehigh and Philadelphia influences, which early became aggressive and hostile to operations upon the Lackawanna. One field was new; the other fairly developed. It was not the character of coal found at Carbondale by Wurts that excited the jealousy of the Lehigh and Schuylkill operators, but the determined character of the Philadelphia gentleman, whose drill marks of industry on the hillsides at Carbondale, bespoke their final triumph, that awakened this opposition. / Lehigh and Schuylkill favored by natural routes, found a market for their coal in Philadelphia which they regarded as belonging exclusively to themselves even after Maurice and William Wurts had schooled the Philadelphians in the art of burning anthracite, for fuel in place of charcoal and wood. / The thirty years expired March 13th, 1853. John Wurts, President of the Company since 1832 was filling his position with his usual fidelity and prudence. The canal, enlarged but nine years before began to be productive of dividends. Unless this fatal Section in the Act to improve the river Lackawaxen was repealed the Delaware and Hudson Canal Company, as a Chartered Company, would cease to exist in Pennsylvania. / Philadelphians, inimical at that time to all northern improvements and especially to this because of its New York

affinities, watched the movements of the Company with distrust, if not dislike. The Village of Carbondale founded and named by Maurice and William Wurts, was called in derision by Lehigh operators 'The New York Colony.' Its founders were driven by necessity to make that city the chief seaboard market for coal rather than their native city where Lackawanna Coal had been condemned by rival operators, while the State of New York generously loaned its credit of \$500,000 to the Company from the start. / The less discreet enemies of the Delaware and Hudson Canal Company, had boasted as shown in preceding pages that this canal would become the property of the State of Pennsylvania in 1853 by the expiration of the Charter and that 'the days of this foul incorporation are numbered in 1853.' In anticipation of this expiration, to wit; on the 3rd of April 1851, the House of Representatives of Pennsylvania passed a resolution appointing three of its members a committee to sit during the recess of the Legislature, to take testimony, and generally to investigate the affairs of the Delaware and Hudson Canal Company, with reference to this reserved right of the State, and to report to the next Legislature. The Committee met, and in pursuance of the object of their appointment, sought information from the officers and agents of the Company on various points. Although not recognizing the reservation in the Section above referenced to as applicable to this Company, and at any rate regarding the inquiry as premature yet the Board of Managers did not hesitate to grant to the Committee any light or information that it desired in relation to the subject of its appointment. The Officers and agents of the Company appeared before the Committee, and answered all such inquiries as were propounded to them and the books and vouchers were freely offered to them for their inspection. On the 18th of January 1852, the Committee presented its report to the House of Representatives, stating as to the conclusion to which it had arrived, that, 'if the Commonwealth shall resume the Pennsylvania Section of the Delaware and Hudson Canal Company, the sum of \$1,246,437.64 must be paid to the Company, that being the difference between the amount of tolls received and the cost of construction and repairs.' / In this conclusion of the Committee, the Board of Managers was by no means concurred; on the contrary, even supposing the right of resumption to exist on the part of the State, still, according to the views of the Board, the right could not have been exercised without the payment of a much larger sum to the Company. An account made up to February 28th, 1851, showing the views of the Board as to the amount up to that date, was submitted to the Committee on behalf of the Company, and accompanied the Report to the Legislature. / In the years of 1830 to 1851 Luzerne County was entitled to but two representatives, one of whom was Hon. Silas S. Benedict, [emphasis added] of Carbondale, a firm friend of internal improvements. A man of probity and purity of character, aiming for neither emolument or position, full of suavity, candor and good sense, his home in the glen where Wurts invited twilight and cheered the intervals with thought and thrift, familiar with the History of the Company and the condition of the Valley before and after this incorporation had diffused prosperity among the yeomanry of the coal district, no man in 1851 could have been chosen by the people of Luzerne, more qualified to represent its affairs in the Legislature than was Mr. Benedict. / This was his second term of service at Harrisburg and the good impression he had made the year previous, gave him prestige and standing in the House. In connection with Hon. Thomas J. Hubbell, of Wayne County, Mr. Benedict was intrusted to influence the Legislature to repeal the objectional [objectionable] Section of the Act to improve navigation of the River Lackawawen. A trifling circumstance adroitly turned to account by Mr. Benedict, contributed to make the Charter of this Company perpetual. / A number of gentlemen at the

Session of 1851-2 were candidates for Speaker. Among them was John S. Rhay, from Western Pennsylvania, prominent at home and yet without sufficient political strength to assume his election unless representatives from Northeastern Pennsylvania acknowledging S. S. Benedict as their leader would come to his aid. Being earnestly solicited by Rhay, whom Benedict knew to be well-qualified for the place, for his vote and influence, Benedict promptly nominated him and as was as promptly elected Speaker of the House. The new Speaker could not refrain from tendering Benedict the Chairmanship of any Committee he chose to accept. Mingling shrewdness with his native modesty to the surprise of all he selected the Chairmanship of Internal Navigation. / The Lackawanna Creek—or the River Lackawaxen of Wurts Map is a nervous stream that twisted its low waters around the Hills of Wayne on its way to the Delaware with a larger volume than now when Maurice Wurts first asked legislative permission to slacken its gait, again subserved a most commendable object. It concealed from the eye of jealousy the corporative powers investing it. No one uninformed saw the Delaware and Hudson Canal Company implied in the Improvement act, as the name or even the mention of any Company appeared in the original Act of 1823. / Early in the Session of 1851-2, S. S. Benedict suggested the propriety of repealing this Section of the Act to improve the navigation of the River Lackawaxen. It was referred to the Committee of which he was Chairman. He explained its character and its vast importance to the coal section he represented and that its passage would be considered complimentary to himself without being of any pecuniary personal advantage. / The subject became one of consideration and discussion in that body; and finally on the 30th day of April, A.D. 1852 a bill was passed which enacted "That the 18th section of an act entitled 'An Act to improve the navigation of the River Lackawaxen,' passed the 13th day of March 1823, which provides for the resumption by the State of the improvements of the Delaware and Hudson Canal Company, known as the Pennsylvania section of the Delaware and Hudson Canal together with the corresponding stipulations, if any, in the supplements to said Act, be, and the same are hereby repealed and the Delaware and Hudson Canal Company are hereby authorized to conduct their business as they have heretofore done according to their Charter and maintain and use their works and appurtenances as heretofore without liability to account and surrender as provided for in the said 18th Section of the aforesaid Act passed on the 13 day of March, 1823." / Thus, persons inimical to the Delaware and Hudson Canal Company because of jealousy saw a tenure of life given to this corporation which they could not prevent and did not fully understand until after the final passage of the repealing act. This Act is a total and unconditional release by the State of Pennsylvania of the right of resumption, if any she had, on any terms and makes the franchises and privileges which the Company holds in Pennsylvania perpetual." (pp. 133-39).

Six weeks later:

2. April 23, 1823: New York legislature passed an act to incorporate "The President, Managers and Company of the Delaware and Hudson Canal Company." This New York law gave the Wurts brothers the authority (1) to open water communication between the Delaware River and the Hudson River (to construct a canal from Rondout on the Hudson River to Saw Mill Rift on the Delaware River) and (2) to purchase coal lands and to transport stone coal to the city of New York and elsewhere in the state of New York.

It is interesting to note, in this statute, the names of the persons, under whose "management and superintendence" the books were opened to receive and enter subscriptions (to the amount of five hundred thousand dollars, in shares of one hundred dollars each share) for the purpose of cutting a canal, and making a complete slack water navigation between the rivers Delaware and Hudson. They were "G. B. Vroom, Philip Hone, Lynde Catlin, Jonathan Thompson, Garret B. Abeel, George Janeway, and Elisha Tibbits of the city of New York, or any three or more of them in the city of New York; and under the management and superintendence of George D. Wickham and Hector Craig, of the county of Orange, and Abraham Hasbrouck, and John C. Broadhead, of the county of Ulster, or any two of them, at such place or places within the counties of Orange, Sullivan, or Ulster, as they or any two of them may deem expedient. . .".

Whenever two thousand shares were subscribed to, "the persons so subscribing, and those who may hereafter subscribe to the stock of the company hereby incorporated, shall be and they are hereby made and constituted a body politic and corporate, by the name, style and title of 'The President, Managers and Company of the Delaware and Hudson Canal Company,' and by that name shall be capable of perpetual succession, may sue and be sued, defend and be defended, in law and equity, in all courts whatsoever, may have and use a common seal. . ."

The second from the last paragraph of this New York statute (paragraph 21), it is interesting to note, makes it lawful for the The President, Managers and Company of the Delaware and Hudson Canal Company to purchase all the rights, privileges and immunities granted to Maurice Wurts, his heirs or assigns, by the Legislature of Pennsylvania in the March 13, 1823 Pennsylvania statute that authorizes Maurice Wurts to improve the navigation on the River Lackawaxen.

Here is the text of that April 23, 1823 act of the New York legislature which brought into existence "The President, Managers and Company of the Delaware and Hudson Canal Company":

NEW YORK

CHAPTER 238. LAWS 1823.

AN ACT TO INCORPORATE THE PRESIDENT, MANAGERS AND COMPANY OF THE DELAWARE AND HUDSON CANAL COMPANY.

Became a law April 23, 1823, with the approval of the Governor. Passed, by a two-third vote.

Whereas it is desirable that a channel should be opened, through which the city of New York, Preamble. and other parts of this state, may receive a supply of stone coal, which is found in the interior of the State of Pennsylvania:

And Whereas there is a large body of this valuable article, belonging to Maurice Wurts, of the said state of Pennsylvania, situated near the head waters of the river Lackawaxen, which empties into the river Delaware, opposite the county of Sullivan; and the legislature of that state has recently passed an act, authorizing the above named individual to improve the navigation of the said river:

And Whereas it is represented, that a water communication can be formed between the rivers Delaware and Hudson, through the counties of Orange, Sullivan and Ulster, or some one or more of them, so that a supply of this coal may be had from the source aforesaid; and a number of the citizens of this state have petitioned the legislature to incorporate a company for the purpose of making such a communication between the said rivers:

Therefore,

Be it Enacted, By the people of the State of New York, represented in Senate and Assembly, That for the purpose of cutting a canal, and making a complete slack water navigation, between the rivers Delaware and Hudson, it shall be lawful to open books for receiving and entering subscriptions to the amount of five hundred thousand dollars, in shares of one hundred dollars each share, under the management and superintendence of G. B. Vroom, Philip Hone, Lynde Catlin, Jonathan Thompson, Garret B. Abeel, George Janeway, and Elisha Tibbits of the city of New York, or any three or more of them, in the city of New York, and under the management and superintendence of George D. Wickham and Hector Craig, of the county of Orange and Abraham Hasbrouck and John C. Broadhead of the county of Ulster, or any two of them, at such place or places within the counties of Orange, Sullivan or Ulster, as they or any two of them, may deem expedient; the said books shall be opened at such time as the above named commissioners may think most suitable, of which they shall give at least thirty days notice, by advertisement inserted in at least two newspapers printed in the city of New York, and one newspaper printed in the counties of Orange, Sullivan or Ulster, and they shall continue open for the space of thirty days, if the whole number of shares aforesaid should not sooner be subscribed; and if, at the expiration of that time, the whole number of shares aforesaid, or any part thereof, shall not have been subscribed, then it shall be lawful for the commissioners above named, to adjourn from time to time, and place to place, until the whole number of shares shall be subscribed, of which adjournment they shall give such public notice as the occasion may require: *Provided*, That every person offering to subscribe to the said stock, shall previously pay to the attending commissioners, the sum of five dollars for every share by him subscribed; out of which shall be defrayed the expenses attending the taking of such subscriptions, and other incidental expenses, and the remainder shall be paid by the said Commissioners to the treasurer of the corporation hereby created, as soon as the same shall be organized, and the officers chosen, as hereinafter mentioned.

And be it Further Enacted, That whenever two thousand shares shall have been subscribed as aforesaid, the persons so subscribing, and those who may thereafter subscribe, to the stock of the company hereby incorporated, shall be, and they are hereby made and constituted a body politic and corporate, by the name, style, and title of "The President, Managers and Company of the Delaware and Hudson Canal Company": and by that name shall be capable of perpetual succession, may sue and be

Corporation created.

Corporate name and general powers.

sued, defend and be defended, in law and equity, in all courts whatsoever; may have and use a common seal, such as they shall devise, and the same may alter and change at pleasure; and may make and establish such by-laws, rules and regulations as shall from time to time appear necessary and convenient for the good government of said corporation, and the due management of their property, interests and affairs; *Provided* the same be not repugnant to the constitution and laws of this state, or of the United States; and shall be capable of taking and holding their capital stock, and the increase and profits thereof, and of enlarging the same from time to time by new subscriptions, in such manner and form, as they shall think proper, under the same rules, regulations and penalties however, as are, or may be imposed on the original subscribers, if such enlargement shall be found necessary to fulfill the intention of this act; and shall be capable also, of purchasing, taking and holding to them, their successors and assigns, in fee simple, or for any less estate, all such lands, tenements, hereditaments and estate, real and personal, as shall be necessary to them in the prosecution of their works; and generally, shall have power to do and execute all and singular the acts, matters, and things, which to the said corporation it may appertain to do, under the regulations, restrictions, limitations and provisions herein prescribed and declared.

Managers.

And be it Further Enacted, That the management of the concerns of the said corporation, shall be entrusted to thirteen managers, who shall be stockholders; and the commissioners named in the first section of this act, or a majority of those of them who may attend to the receiving of subscriptions, shall designate the time and place of holding the election for the first board of managers, and give reasonable notice thereof; and the said commissioners, or a majority of them, as aforesaid, shall be inspectors of said election, and shall certify, under their hands, the names of those duly elected, and shall deliver over to them the subscription books; and the managers so elected shall hold their office for one year after their election, as aforesaid or until others shall be elected in their places; and that at the first, and all subsequent elections for managers of said company, each share shall entitle the holder to one vote: *Provided, however,* That no transfer of stock shall entitle any person to vote, unless such transfer of stock shall have been entered upon the books of the corporation, at least three days previous to the election at which the vote is offered.

Annual elections.

Notice of meeting.

Vacancies.

Election of officers.

Powers of managers.

And be it Further Enacted, That all elections for managers, after the first, shall be held annually, at such times and places, and under such regulations, as shall be prescribed by the by-laws of the corporation; and the board of managers shall give thirty days notice of each and every election, by advertisement, in at least two of the newspapers of the city of New York; and all elections shall be by ballot, by the stockholders, either in person or by proxy; and the persons who shall have the greatest number of votes, shall be the managers; and if two or more persons shall have an equal number of votes, then the said commissioners, at the first election, and afterwards the managers in office, at any future election, or a majority of them, shall, by a plurality of ballots, determine which of the said persons, so having an equal number of votes, shall be a manager or managers, so as to complete the whole number to be elected; and all vacancies that may occur by death, resignation or otherwise, in the board of managers, shall be filled, for the remainder of the year in which they shall happen, by such person or persons, as the residue of the managers, or a majority of them, shall appoint; and the corporation hereby created shall not be dissolved, by reason of not holding an annual election on the day prescribed by the by-laws; but it shall be lawful for the board of managers, to provide for and direct an election, on any other day, in case the stockholders shall neglect to make an election on the day fixed by the by-laws; and until such provisional election, the managers for the time being, shall continue to discharge the duties of their office.

And be it Further Enacted, That the managers shall choose a president, a secretary and treasurer, to hold their offices during the pleasure of the Board; and a majority of the managers shall be a quorum for the transaction of business; and the said managers shall have power to declare the stock of such persons as shall neglect to pay for the same, according to the terms of the subscription, and all previous payments thereon, to be forfeited to the use of the said company, or may sue for and recover from such delinquent subscribers and stockholders, the amount due on such shares, in an action of assumpsit, in any

court having cognizance thereof, whether any payment shall have been made by such delinquent subscriber, on such stock, or not; and no stockholder whether an original subscriber, or an assignee, shall be entitled to vote at any election, or at any general or special meeting of the said company, on whose share or shares, any instalment or arrearages may be due and payable more than thirty days previously to such election or meeting.

And be it Further Enacted, That the board of managers shall meet at such times and places as shall be found most convenient for the transacting of their business; and when met in the absence of the president, may choose a chairman; and they shall keep minutes of all their transactions fairly entered in a book; and a quorum being formed, they shall have full power and authority to appoint all such surveyors, engineers, superintendents, and other artists and officers, as they shall deem necessary to carry on their intended works, and to fix their salaries and wages; to ascertain the times, manner, and proportions in which the stockholders shall pay the monies due on their respective shares; to draw orders on the treasurer: *Provided*, That such drafts or orders be signed by the president, or in his absence by a majority of the quorum present; and generally to do all such other acts, matters and things, as by this act, and by the by-laws and regulations of the company they may be authorized to do.

And be it Further Enacted, That the managers first chosen, shall procure certificates or evidence of stock for all the shares of the said company, and shall deliver one such certificate, signed by the president and countersigned by the treasurer, and sealed with the common seal of the said corporation, to each person for every share by him subscribed and held; which certificates or evidence of stock, shall be transferable at the pleasure of the holder, in person or by attorney duly authorized in presence of the president or treasurer, each of whom shall keep a book for that purpose, subject, however, to all payments due or to become due thereon; and the assignee holding any certificate, having first caused the assignment to be entered in a book of the company to be kept for the transfer of stock, shall be a member of the said corporation, and for every certificate assigned to him as aforesaid, shall be entitled to one share of the capital stock, and to all the estates and emoluments of the company incident to one share, and to vote as aforesaid at the meetings thereof, and shall be subject to all the forfeitures, and to being sued for all the balance due or to become due on each share, as the original subscribers would have been.

And be it Further Enacted, That the corporation created by this act, be and they hereby are authorized and empowered to make, construct and forever maintain, a canal or slack water navigation of suitable width, depth and dimensions, to be determined by the said corporation from such point on the river Delaware, within the jurisdiction of this state, through any one or more of the counties of Orange, Sullivan and Ulster, to such point on the river Hudson, as the said corporation shall judge best; said corporation may form and construct a towing path, or paths; all necessary locks, aqueducts, culverts, dams, waste wiers, and toll houses, artificial harbors for boats, side cuts or lateral canals, connected with said basins or with the said Delaware or Hudson river, at such place or places, as shall be found expedient; and all necessary feeders from said rivers or from other streams, if more convenient, and all other works incident to, or necessary and convenient for constructing, maintaining and repairing said canal or navigation.

And be it Further Enacted, That said corporation may purchase, and forever hold, any, and all, lands and real estate necessary for constructing, maintaining and repairing said canal, and the works connected therewith as aforesaid; and may also receive, hold, and take all voluntary grants and donations of real estate and lands which shall be made to them to aid the objects of said corporation; and whenever in either of the ways aforesaid, said corporation shall become possessed of, and own any lands and real estate which it may be unnecessary for them to retain for the purposes aforesaid, it shall be lawful for them to lease, occupy, alien and convey the same by lease or deed, with their seal affixed thereto; and to sell or lease any and all surplus waters of said canal not wanted for the most commodious navigation thereof, on such terms, and for such purposes, as they shall deem expedient; and for the purpose of assuring to said corporation all the lands, real estate, and waters requisite, for most economically constructing and maintaining said canal, and the works connected therewith, and incident and necessary to the navigation of the

Time and
place of hold-
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meetings.

Stock transfer-
able.

Canal to be
made.

Powers inci-
dent to mak-
ing canal.

same, whenever the said lands and waters shall not be obtained by voluntary donation or fair purchase, it shall be lawful for said corporation by their agents, superintendents or engineers, to enter upon, take possession of, and use all such lands, real estate and streams as shall be necessary for the purposes aforesaid; and in case of disagreement, between the managers of the company and any person or persons, owning any land or property which the said corporation may so occupy as aforesaid, or which may be injured by the necessary operations to complete such navigation, respecting the amount of the damages sustained by such person or persons, it shall be lawful for the parties to appoint five suitable and judicious persons, who shall be under oath or affirmation, fairly and impartially to estimate the same, and who shall reside within the proper county where the land lies; but if the parties cannot agree upon such persons, or if either party shall refuse or neglect to join in such appointment, within twenty days after requisition for that purpose upon him made, or if the owner of such lands shall be feme covert, under age, non compos mentis, or out of the state, or if the persons or a majority of the persons appointed by the parties, shall not within thirty days after receiving notice of their appointment, file a report of their estimate in the office of the clerk of the Court of the county where the land lies, then and in either of these cases, either of the parties may apply to the court of the county where the land lies; and the said court shall award a venire, directed to the Sheriff, requiring him to summon a jury of disinterested men, in order to ascertain and report to the said court, under their oaths or affirmation, what damages, if any have been sustained by the owner or owners of said land or property; which report being confirmed by the court, judgment shall be entered thereon, and execution may issue, in case of non-payment for the sum awarded, with reasonable costs, to be assessed by the court; and it shall be the duty of the jury or five appraisers as the case may be, in valuing any land or property, or in estimating the damage done thereto, to take into consideration the advantages derived to the owner or owners of the premises, from the said navigation passing through the same; and it shall further be the duty of the said jury or appraisers, to describe and ascertain the bounds of the lands or premises by them valued, and annex the same to their report or appraisement—*provided always* that either party may appeal to the court of the county in which the premises are situated, within thirty days after such report may have been filed in the office of the clerk of the court of the county, in the same manner as appeals are allowed in other cases—and on payment by the company to the owner or owners of premises, of the sum awarded by the five appraisers, or by the report of the jury, or by final judgment on appeal from such report, as the case may be, the said company shall be seized in fee of the premises by them occupied and used as aforesaid, as if the same had been conveyed by the owner or owners to them, and their successors in fee by legal conveyance.

Penalties for
misdemeanors,
&c.

And be it Further Enacted, That if any person or persons shall be injured, by means of any dam or dams, being erected, under the provisions of this act, or the land of any person shall be inundated, by swelling the water, by means of any dam or dams, or any mill, or other water works, injured by swelling the water into the tail race of any such mill, or other water works, which may have been erected on any stream that the corporation hereby created may use for the improvements authorized by this act; and if the managers of the said corporation cannot agree with the owner or owners thereof, as to the compensation to be paid for such injury, the same proceedings shall be had, as is provided in the preceding section of this act; and the persons or jury, valuing the damages, having been first sworn or affirmed; justly and impartially to assess the same, shall take into consideration the advantages which may be derived by such owner or owners, from the navigation aforesaid.

Entering on
lands, &c.

And be it Further Enacted, That the managers of the said corporation, by and with their superintendents, engineers, artists, workmen and laborers with their tools, instruments, carts, wagons and other carriages, and beasts of draught and burthen, may enter upon the lands contiguous and near to the track of the said intended canal or navigation giving notice to the owners or occupiers of such lands, and from thence take and carry away any stone, timber, gravel, sand earth or other material, doing as little damage thereto as possible, and repairing any breach they may make in the enclosures thereof, and making amends for any damages that may be done thereon, and paying for the materials so taken away, the amount whereof, if the parties cannot agree, shall be assessed and valued by any three disinterested free-

holders, residing in the neighborhood, under oath or affirmation, to be appointed by the parties; or if they cannot agree in their appointment, then to be appointed by any disinterested justice of the peace of the township; and it shall be the duty of the said freeholders, to file a report of their assessment, within seven days after they shall have agreed upon the same, with a neighboring justice of the peace, by whom the same shall be entered upon his docket; and the said freeholders shall also, within the said seven days, notify each of the parties of the name of the justice of the peace with whom their report has been filed; and either party may appeal from said report to the court of the county, at any time within thirty days after the same shall have been so filed.

And be it Further Enacted, That it shall and may be lawful for the managers of the said company, as soon as the said canal and navigation, or any fifteen miles thereof, shall be completed so as to allow of the passage of boats, to appoint such and so many collectors of tolls for the passage boats and vessels in and through the same, and in such places as they shall think proper, and that it shall and may be lawful for such collectors of toll and their deputies to demand and receive of and from the persons having charge of any boat, ark, craft, raft or other vessel passing through the said canal and navigation, such toll and rates as the said managers shall think proper, at any lock or other convenient place:

Provided, That the said toll shall not in the whole, exceed the rate of eight cents per mile, for every ton weight of the ascertained burthen or capacity of any boat, ark, craft or vessel, laden with or engaged in the transportation of stone coal; and one-half that sum for every ton weight of the ascertained burthen or capacity of any boat, ark, craft or vessel laden with or engaged in the transportation of any other article of merchandise; and the same for every hundred feet cubic measure of timber, and one thousand feet board measure of boards, plank or scantling, and for every five thousand shingles, and so in proportion for any other distance, and less number of locks.

And be it Further Enacted, That the collectors of tolls duly appointed by the managers of the company, may stop and detain all boats, vessels, craft or rafts, using the said canal and navigation, until the owner or commander, or supercargo of the same shall pay the toll so as aforesaid fixed; and if any owner, skipper, or supercargo of any boat or ark, craft or raft, shall pass by any place appointed for receiving tolls, without making payment thereof according to the provisions of this act, and with intent to defraud the said company out of such toll, he, she, or they, so offending, shall forfeit and pay for every time they shall so pass by each appointed place, to the said company, the sum of twenty dollars, to be sued for and recovered by action of debt, in like manner and subject to the same rules and regulations as debts under fifty dollars, may be sued for, and recovered, together with the costs of suit.

And be it Further Enacted, That in order to ascertain the tonnage of boats, using and passing the said navigation, and to prevent disputes between the supercargoes and collectors of tolls, concerning the same, upon the request of the owner, skipper or supercargo of such boat, or of the collector of said tolls, at any lock or place appointed for receiving of tolls upon the said navigation, it shall and may be lawful for each of them to choose one skillful person to measure and ascertain the tonnage the said boat is capable of carrying, and to mark the said tonnage so ascertained, in figures upon the head and stern of the said boat, in colors mixed with oil or other durable matter; and the said boat or vessel so measured and marked shall be permitted to pass through the said canal and navigation, for the price to which the number of tons so marked on her shall amount, agreeably to the rates fixed in the manner aforesaid; and if the owner, skipper or supercargo of any boat, shall decline choosing a person to ascertain the tonnage thereof, then the amount of such tonnage shall be fixed and ascertained by the person appointed for that purpose by the managers of the corporation, or chosen by the said collector of tolls; and the tolls shall be paid according to such measurements before any such boat shall be permitted to pass the place where such toll is made payable.

And be it Further Enacted, That if any person shall willfully and knowingly do any act or thing whereby the navigation shall be impeded, or any dam, lock, gate, canal, engine, machine, property or device whatsoever, thereunto belonging, shall be injured or damaged, he, she, or they, so offending, shall forfeit

Collectors of tolls.

Powers of collectors.

Tonnage, how ascertained, &c.

Injuries to canal, &c.

and pay to the said corporation four times the amount of the damages by them sustained, together with costs, to be recovered by action of debt, before a justice of the peace, or in any court of competent jurisdiction.

Trumpets to be blown

And be it Further Enacted, That it shall be the duty of the master or commander of any boat, ark, craft or vessel, passing through said navigation, when he shall arrive within one fourth of a mile from any lock erected in said navigation, under the penalty of two dollars, to blow a trumpet or horn, whereupon the keeper of such lock shall attend for the purpose of opening the gate or sluice to let the said boat, ark, raft or other vessel pass, without unnecessary delay, and in safety; and if any boat, ark, raft or other vessel shall be prevented from passing up or down any of said locks or sluices, by reason of the lock not being raised, for more than thirty minutes, the said corporation shall, on conviction thereof before any justice of the peace of the proper county, forfeit and pay to the person so hindered, the sum of one dollar for every thirty minutes beyond the said time, that he shall be so prevented, and in the same proportion for any longer or shorter time; and the service of any civil process upon the toll-gatherer in the proper county, and next to the place where the offence shall have been committed, shall be held as good and as available in law as if served upon the president of the said corporation.

Neglects of corporation.

And be it Further Enacted, That if the said corporation shall neglect or refuse to keep in repair and good order any dam, lock or sluice of their own construction, or shall neglect to remove any obstacle which may occur, so that boats, arks, rafts or other vessels, may safely use said navigation, in the manner provided by this act, the said corporation shall, for every such offence, forfeit and pay the sum of one hundred dollars, to be sued for and recovered in any court of competent jurisdiction, one half to the use of the informer, and the other half to the use of the poor of the township or county, where the neglect may occur; and the service of process upon the toll gatherer in the proper county and next to the place where the offence shall have been committed, shall be held as good and as available in law, as if served on the president of the said corporation.

Damages to be appraised.

And be it Further Enacted, That wherever any sluice or canal made by the company hereby incorporated shall cross any public or private laid out road or highway, or shall divide the grounds of any person or persons, into two parts, so as to require a ford or bridge to cross the same, the appraisers or jury who shall inquire of the damages to be sustained, in the manner directed by the ninth section of this act, shall find and ascertain whether a passage across the same shall be admitted or maintained by a ford or bridge, and on such finding, if in the affirmative, the said company shall cause a ford to be rendered practicable, or a bridge fit for the passage of wagons, and carts, to be built, and forever thereafter to be maintained and kept in repair, at all and every place or places so ascertained by the said jury, at the cost and charges of the said company; but nothing herein contained, shall prevent any person from erecting and keeping in repair, any foot or other bridge, across any sluice or canal, at his own expense when the same shall pass through his ground: *Provided*, That such foot or other bridges, so to be erected by the owners of such land, shall not interfere with any sluice or lock or other works of the said company.

Accounts to be kept.

And be it Further Enacted, That the managers of the said company, shall keep fair and just accounts of all monies received by them from the commissioners named in the first section of this act, and from the subscribers to the company, on account of their several subscriptions; and the amount of the profits on the shares which may be forfeited as aforesaid, and also of all monies by them expended in the prosecution of the said works; and shall, in every year, submit such accounts to the stockholders, at their annual meeting to choose officers of the company; and the aggregate amount of such receipts and expenditures, shall be ascertained, and if upon such liquidation, or when the capital stock shall be nearly expended, it shall be found that the said capital stock will be insufficient to complete the said navigation, and effect the objects designed by this act, according to the true intent and meaning thereof, it shall be lawful for the said managers, with the concurrence of the stockholders, given at a stated, or at a special meeting convened for the purpose, to increase the number of shares to such extent as shall be deemed sufficient to

Capital stock may be increased.

accomplish the work, and to receive and demand the monies for shares so subscribed, in like manner and under like penalties as are herein before provided, for the original subscription, or as shall be provided by their by-laws.

And be it Further Enacted, That the said managers shall also keep a just and true account of all the monies received by their several and respective collectors of toll, and all other emoluments; and shall make and declare a dividend of the clear profits and income thereof, among all the stockholders not in arrear to the company, all contingent costs and charges being first deducted, and shall on the first Monday in June, and the first Monday in December, in every year publish the half yearly dividends made of the clear profit, and the time when and where the same will be paid to the stockholders, not exceeding twenty days thereafter, and shall cease the same to be paid accordingly.

And be it Further Enacted, That it shall be lawful for the corporation hereby created, or for the commissioners named in the first section of this act, if they shall think proper, to contract, for the use and benefit of said corporation, with Maurice Wurts, of the State of Pennsylvania, for the purchase of all the rights, privileges, and immunities, granted to him, his heirs or assigns, by the legislature of the said state, by an act, entitled "An act to improve the navigation of the river Lackawaxen", and also for the purchase of any lands containing stone coal, that he or any other person may own at or near the head waters of the said river; and after such purchase, to receive a conveyance of, and hold the same in like manner as the said Maurice Wurts, or such other person now does, or can do; and it shall also be lawful for the said corporation to apply any part of their capital to the payment and satisfaction of such purchase, and also to the improvement of the said river Lackawaxen, in the same manner as the said Maurice Wurts is authorized to do by the above mentioned act; *And Further*, to employ so much capital as they may deem expedient, in the business of transporting to market the coal which they may have purchased as aforesaid.

And be it Further Enacted, That the said Company shall not by anything in this act contained, be authorized to take possession of or exercise any control over any private property, land or water without the consent of the owner thereof until ample security shall be given by such company to be approved of by the clerk of the County wherein the same is situated to pay the damages to be assessed as aforesaid as provided by this act.

Accounts of toll, &c.

Dividends (Amended March 25, 1863)

Power to purchase right of M. Wurts, &c.

Private property how to be taken, &c.

Given below are photographs of two details of the oil painting by Ezra Ames of Governor DeWitt Clinton holding a copy of the signed bill passed by the legislature of New York on April 23, 1823. This very large oil painting (possibly 5' x 8') is in the collection of the D&H Canal Historical Society and Museum in High Falls, NY, where it was photographed by the author on October 23, 2013.

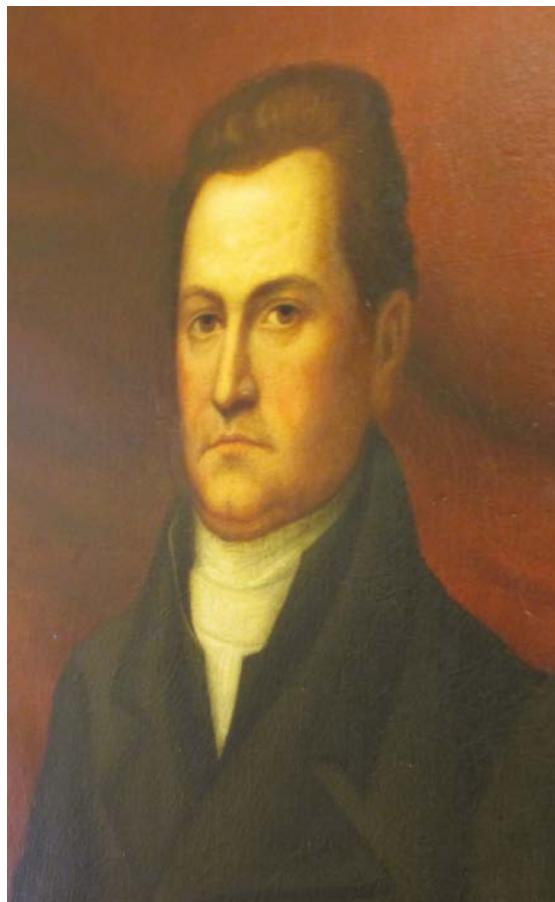
More on Ezra Ames (May 5, 1768 – February 23, 1836):

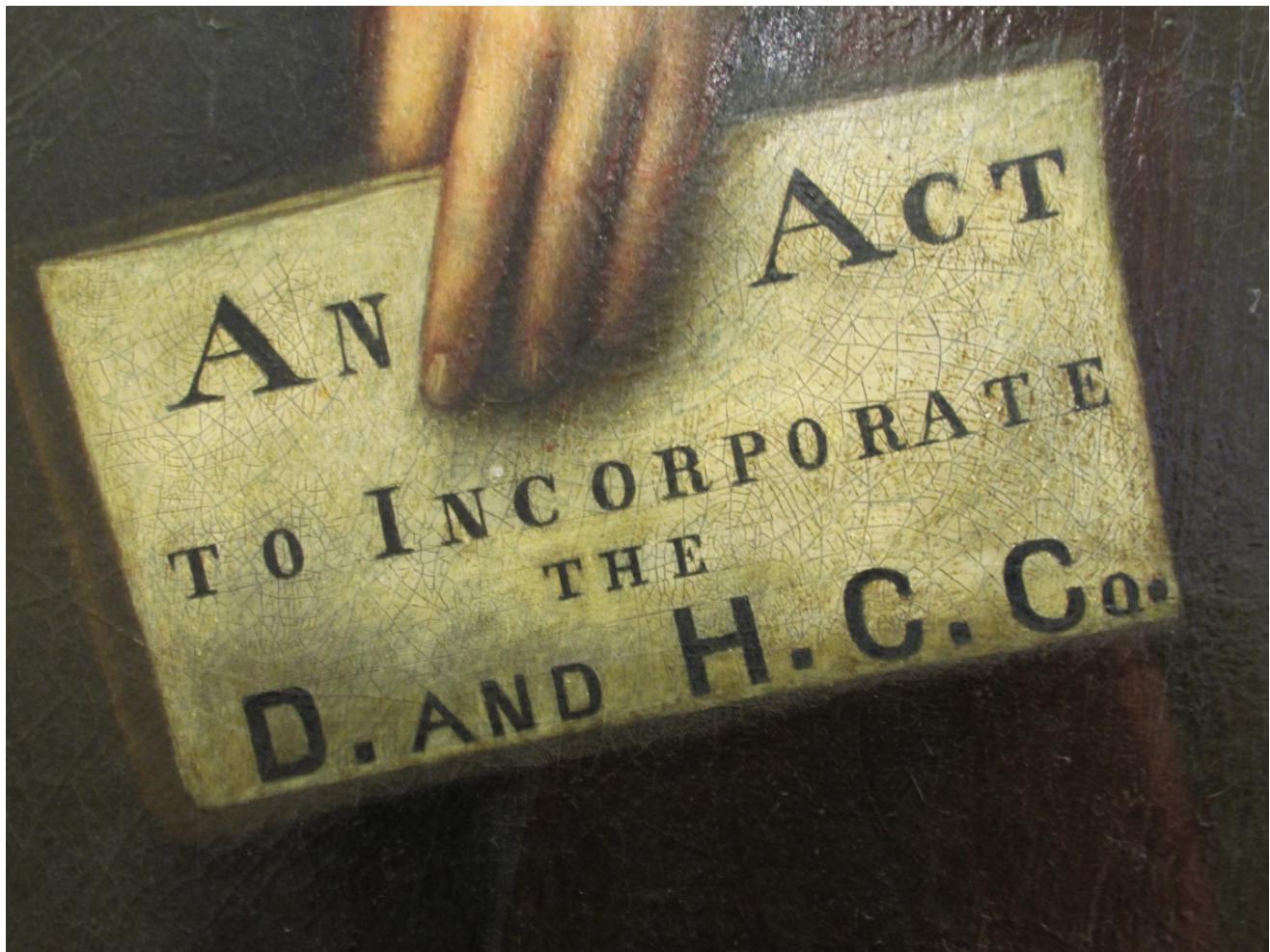
He was a popular portrait painter in Albany, New York during the late eighteenth and early nineteenth centuries. More than 700 portraits have been attributed to him. He was born in Framingham, Massachusetts in 1768. He moved to Worcester, Massachusetts, in 1790, and married Zipporah Wood in 1794. Some time later he moved to Albany, New York where he painted a number of prominent people, including early portraits of Governor George Clinton and Alexander Hamilton. It is not known whether Ames was formally trained or not, but his work had a popular appeal. In addition to portraits and landscapes, Ames' surviving accounts books indicated he painted miniatures, carriages, fire buckets, fences, mirror frames, and furniture.

Ames painted a number of still-lifes, landscapes, and history paintings, and was skilled at engraving. The *Chautauquan* magazine describes his importance in this way; "[he] was the most noted portraitist in the state, outside New York city. The sure and fluent ease of his brush, his keen characterization, his pure, fresh coloring, are all remarkable for this early period. His portrait of Governor George Clinton, exhibited at the Pennsylvania Academy in 1812, won him wide notice; but he did delightful work some years earlier, and many even finer canvases are scattered through the middle states, in private hands."

During his career Ames painted many members of the New York State legislature and retired comfortably on his savings built up during his prolific career, primarily between 1800 and 1820. In fact he became known unofficially as the "official" New York State portrait painter. Ames was an active freemason, which brought him a number of commissions from his fellows. Ames served as chairman of the Fine Arts Committee of the Society for the Promotion of Useful Arts in 1805, and was also President of the Mechanics and Farmers' Bank of Albany. He died in 1836 and is buried at the Albany Rural Cemetery (Lot 1 Section 59). Ames was posthumously elected an honorary member of the American Academy of Fine Arts in New York City.

Here, then, are the two details of the oil painting by Ezra Ames of Governor DeWitt Clinton holding a copy of the signed bill passed by the legislature of New York on April 23, 1823.





Reference Note: All of the Pennsylvania and New York statutes that relate to the Delaware and Hudson Canal Company and the Delaware and Hudson Company for the period 1823-1906 are given in their entirety in *Corporate History of the Delaware and Hudson Company and Subsidiary Companies. Vol. 1 The Delaware and Hudson Company. 1906.* Transportation Library, University of Michigan.

The ten primary sections of this important volume are: 1. Statutes, a. New York, b. Pennsylvania; 2. By-Laws; 3. Increases of Stock; 4. Mergers; 5. Sinking-Fund Ordinance; 6. Mortgage; 7. Car Trust; 8. Debentures; 9. Leases; 10. Trackage Contracts.

Special thanks to Michael J. Yavorosky, Hop Bottom, PA for bringing to our attention this important volume on October 29, 2013, and allowing us to borrow this volume for an extended period.

Will a canal be possible? What is the practicability of building a canal? What will be the expense of constructing a canal:

May 1823: Benjamin Wright, the principal engineer building the Erie Canal, was engaged by the Maurice and William Wurts/the D&H to take measures to have a proper survey or running level carried over the country from 'tide-water of the Hudson River, at the mouth of the Wallkill, up the valley of the Rondout and thence over to the Delaware River, and thence up the same to the confluence of the Lackawaxen, and thence up the Lackawaxen, to a point as near to the Coal Mine as possible,' in order to ascertain the practicability and expense of constructing a canal (slack water navigation) over this route.

Mathews (p. 229) picks up the story there:

"As Mr. Wright could not well disengage himself from his duties in connection with Governor Clinton's favorite enterprise, he deputized Colonel J. L. Sullivan [builder of the Middlesex Canal in Massachusetts] and John B. Mills, two experienced civil engineers, to make the survey. During the summer and fall of 1823 the surveys were made under the immediate supervision of the coal-mine proprietors, and a map of the region and the route was shortly afterwards produced to assist in awakening the interest of Philadelphia and New York capitalists, who had no other knowledge of the obscure coal-fields than they could gain from it."

Survey completed by November 1823.

On that map, seven localities were designated where coal had been discovered: five of them in Carbondale (the main or northern mine was on the eastern bank of the Lackawanna), one below the falls, near Wagner's Gap (Archbald), and the remaining one on the farm of James Anderson, in Providence township, twelve miles below Carbondale.

Mathews was published in 1886. Most interestingly, the account given by Mathews immediately above was "borrowed" by Mathews from Hollister's 1880 unpublished typescript. Here are the words of Hollister:

"As Mr. Wright could not leave Governor Clinton's favorite enterprise, he directed Colonel J. L. Sullivan and John B. Mills two experienced civil engineers to make such surveys. Between the months of May and November 1823 such surveys were made under the immediate eye of the two original proprietors of the coal mine [Maurice and William Wurts]. This main coal opening or mine was designated on a map made by them in 1823 as being one hundred and twenty-one miles from the Hudson, near the river Lackawaxen, four or five miles from Keen's Pond in the State of Pennsylvania where were sundry tracts of land containing inexhaustible quantities of stone coal of the best quality. This map has seven designating marks to denote points where coal had been found. Five of them were around their log cabin in Carbondale, and one below the falls near Wagner's Gap (Archbald) and the other on the farm of the late James Anderson, Providence township, twelve miles below Carbondale. The main or Northern mine was in Carbondale on the eastern bank of the Lackawanna. . ."

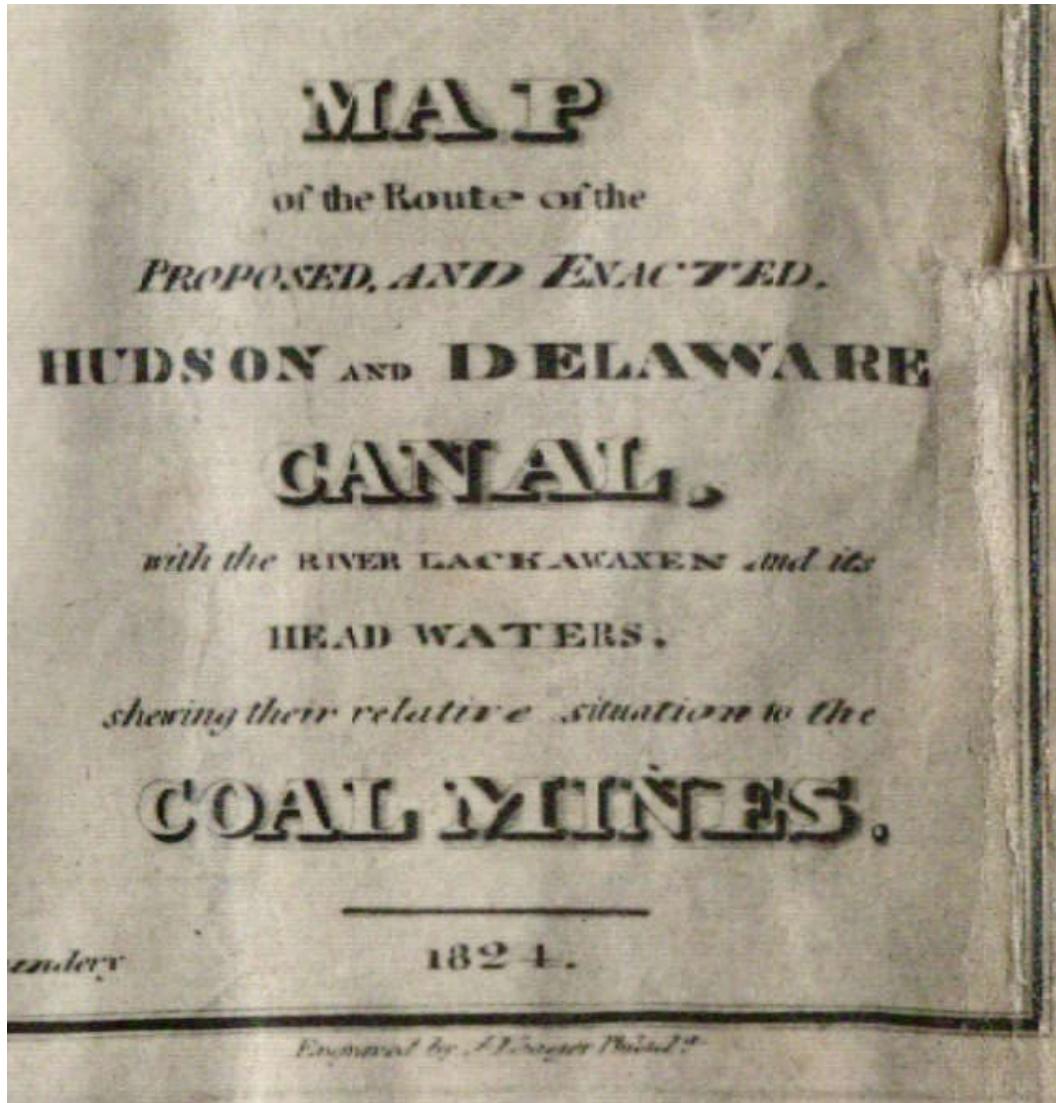
Hollister (pp.20-21) provides some very interesting details about this map:

"This rare map (a few weeks since some one intruded into my office and carried away this map which I have been unable to replace. A similar map was deposited by Mr. Wurt[s] in the archives of the Company. 'This map,' writes Mr. Dickson 'and some of the other accompanying documents were taken by some of the officers of the Pennsylvania Coal Co. some years ago and never returned.') now in the possession of the writer, who obtained it from the late William Wurts in 1856 while the first edition of contributions to the *History of the Lackawanna Valley* was being prepared for the press, was made to attract the attention of New York and Philadelphia capitalists who had no other geographical knowledge of the obscure coal region than that gained by a glance upon its representations. Irving's Cliff – then unnamed but since rendered popular by Washington Irving and James M. Porter in 1843 when it was named frowned upon laurels standing upon the unmapped site of Honesdale, and where Scranton stands appears the bare simple name 'Slocums' upon this suggestive map. / Rixe's Gap in the mountain immediately east of Carbondale opens in the map like a plain through which the slender waters of one of the feeders of Keen's Pond 'lying but four or five miles from the Northern mine, and the distance is capable of a good road or railway and probably a canal. The waters of the Lackawannock (led from some distance above the valley) may possibly feed such a one; not only connecting the mines of these proprietors, but to a greater extent of navigation, as may be apparent on the map. (Report of Messrs. Wright and Sullivan, engineers engaged in the survey of the Proposed Canal from the Hudson to the Head Waters of the Lackawanna River 1824.) It was the favorable impression made upon capitalists by this widely circulated map that led to the consideration and advancement of this great project. Four ponds with an aggregate capacity of six hundred acres lying east of Rixe's Gap in Wayne County are indicated upon the map as Savanna, Keens', Stantons and Hoadleys Pond. It was the original plan of Messrs. Wurts to run the West Branch of the Lackawaxen section of the Canal as far up as Captain Keen's Pond and farther still if it was found that the Lackawannock could be used as a feeder. It was even originally proposed by these gentlemen to make Cobb's Pond—Paupack pond upon their map—the western terminus of the Canal. This natural pond, fed so copiously by unseen springs as to give an outlet equal to canal purposes of that day on the summit of the Moosic mountain, seven miles from Slocums—now Scranton—in a direct line and five miles from their coal opening in Providence. This plan was abandoned, first because the coal at this point was considerably less promising than that at Carbondale, Second, that they could devise no way to ascend and descend the steep mountain with canal boats to their Providence coal bed without incurring an expense appalling and fatal to the scheme. Railroads were unknown in America when their explorations began in the coal field and they gave encouragement and attention to a canal. / The quantity of water held by the first three named ponds was calculated 'to fill a lock 111 times a day for 200 days.' The report says that while 'the head waters of the Vanorca Branch of the Lackawaxen all concentrate at Captain Keen's Pond, the Middle Creek which heads even nearer the coal mine than this pond, may possibly afford a shorter and better route than the West Branch. This will be a matter of inquiry before the work commences.' Whether to ascend the Dyberry or the Wallenpaupack (the Indian significance of this stream is 'Slow and swift water' – a singularly appropriate name as well as a strange opposition of words...) was a long considered question in 1824."

The Canal, possibly to Keen's pond, and possibly farther, if it was found that the Lackawanna could be used as a feeder. Amazing. The canal builders of those days were not even stopped by mountains.

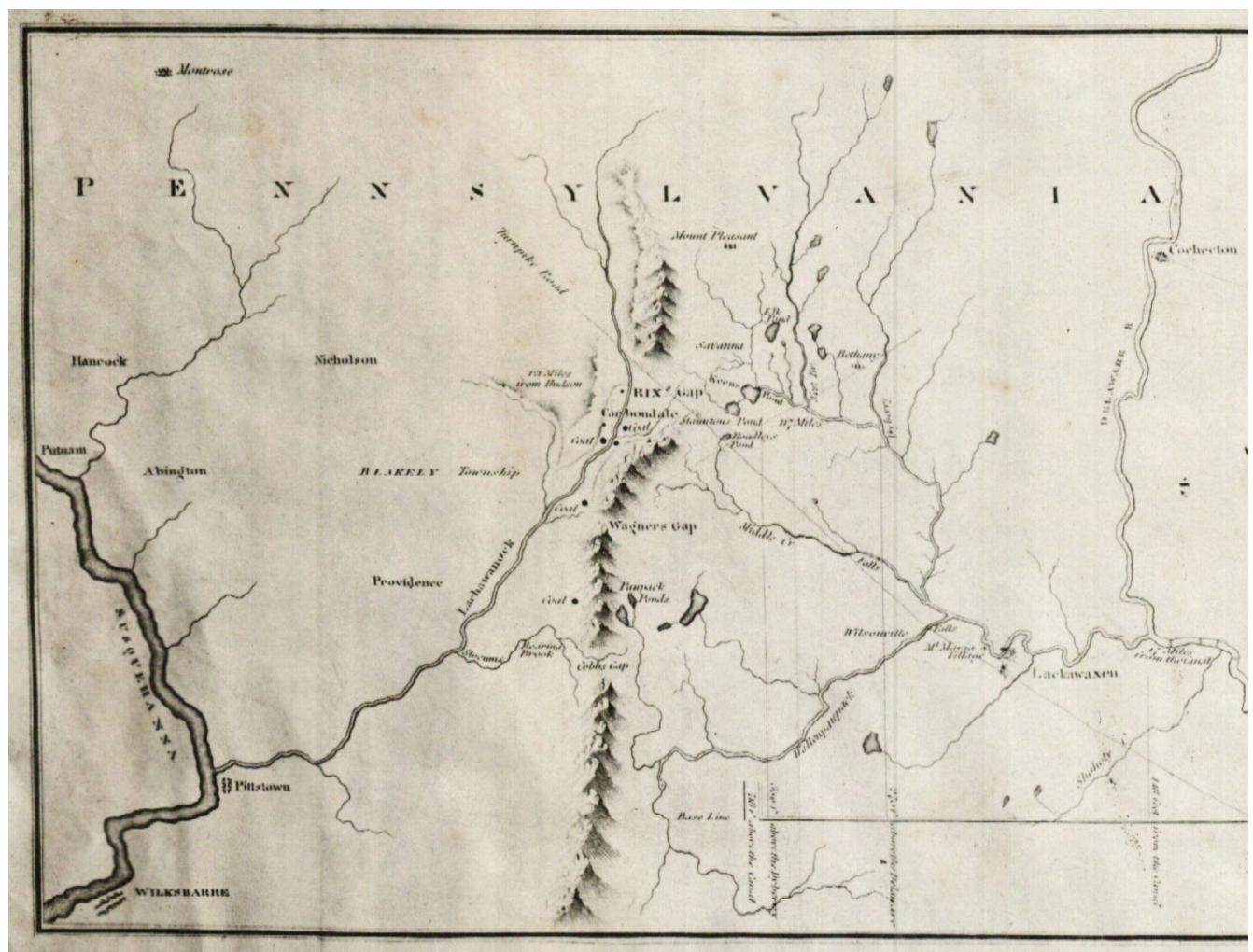
Remarkably, a paper copy of this exceedingly rare map is in the archives of the Pike County Historical Society at Milford, PA, where the author scanned a copy of it on September 20, 2013.

Here is the title information in the lower right-hand corner of the map:

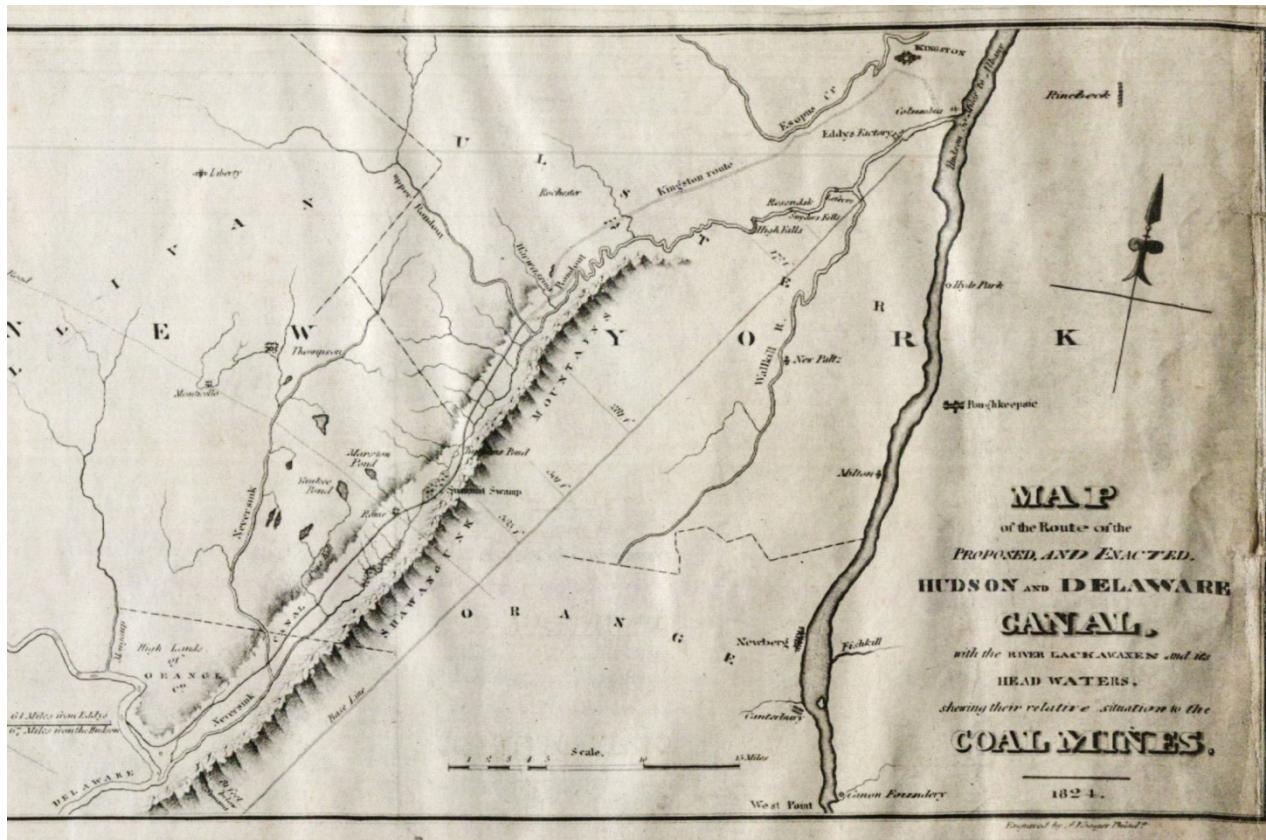


The map has been scanned in two sections: the Pennsylvania section and the New York section.

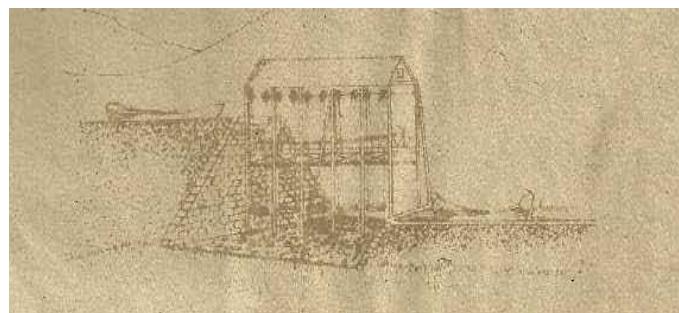
Pennsylvania section:



New York section:



Here is a sketch of the perpendicular lift or moveable lock (sketch included by Hollister between pages 21 and 22 and shown below) that Sullivan proposed to use in a canal between Carbondale and Keen's Pond.



AN OUTLINE of the Lift, showing the situation of an ascending boat; the relative distance and elevation of two levels of a canal. The transit; the weights of one side; the pulleys, axle and chains also of one side only, that the sketch on this small scale might not appear confused.

Hollister concludes (pp. 23-25):

"It appears to me very probable, that on an instrumental examination, it will be found that the Lackawannock may be led to feed a short canal, from the mine [at Carbondale] to Keen's and there would be water enough, for any quantity of business, using the lift. . . . This perpendicular lift or moveable lock . . . , invented by Benjamin Dearborn of Boston had never been built on a large scale but it was intended to serve canal boats over a hill or a mountain where water was very scarce. The report says that: The Lift may be considered a time and water saving machine. [Hollister provides lots of details, pp. 23-24, on how the machine works.] . . . / Engineer Sullivan the agent of Mr. Dearborn urged the adoption of the lift because of its economy in lockage. The same water, he claimed, by being pumped back after a boat had been lifted, could be used over and over again during a whole boating season. The proprietors at first proposed to adopt this plan for the passage of boats along the mountain between Carbondale and the Lackawaxen or Dyberry before a railroad was deemed feasible or even talked of."

Interesting side note:

Hollister, p. 26, reports that in 1880, there were 20,000 persons connected with the Delaware & Hudson canal, railroads, and coal mines.

Ultimately, as we all know, the D&H decided that the terminus of the Canal would be Honesdale.

Another interesting side note: *Hitchcock*, Volume II, p. 325: Carbondale was settled in 1824.

3. April 7, 1824: The April 23, 1823 act passed by the New York legislature that incorporated the D&H C. Co. in New York was now amended (1) to authorize subscriptions to the capital stock up to the sum of \$1,500,000, and (2) to make it possible for the D&H to make a canal or slack water navigation along the New York side of the Delaware River from Carpenter's Point (near present-day Port Jervis), on the Delaware River, or from near that point, to the mouth of the Lackawaxen River. This was the third link in the chain that the parties concerned needed in order to have an uninterrupted corridor between the Hudson River and the headwaters of the Lackawaxen River.

Here is the text of that April 7, 1824 New York law:

CHAPTER 174. LAWS 1824.

AN ACT TO AMEND THE ACT ENTITLED "AN ACT TO INCORPORATE THE PRESIDENT, MANAGERS AND COMPANY OF THE DELAWARE AND HUDSON CANAL COMPANY," PASSED APRIL 23, 1823.

Became a law April 7th, 1824 with the approval of the Governor. Passed, by a two-third vote.

Preamble.

Whereas by the act to which this is amendatory, the corporation thereby created is authorized to use any Capital that may be necessary to effect the objects contemplated by the act, but the amount of original subscriptions is limited to five hundred thousand dollars: *And Whereas*, it appears from an actual survey and examination of the route, that it will require a larger sum to make a canal or slack water navigation, from the Hudson to the head waters of the Lackawaxen: and the proprietors of the coal mines near this river, have represented to the Legislature, that they deem it expedient that the whole line of improvement, should be made by one Company, to be organized under the act to which this is amendatory.

THEREFORE,

Stock
subscription
enlarged to
\$1,500,000.

Be it Enacted by the people of the State of New York represented in Senate and Assembly, that for the purpose of effecting the objects contemplated by the act, to which this is amendatory, the subscriptions of five hundred thousand dollars authorized by the first section thereof, shall be and the same is hereby enlarged to the sum of fifteen hundred thousand dollars, any thing in the said act to the contrary notwithstanding.

Further
powers
granted.

And be it further enacted, that for the purpose of making a canal or slack water navigation, from or near Carpenter's point, on the river Delaware, to the mouth of the river Lackawaxen, the said corporation shall have and possess, within the jurisdiction of this State, the same powers, privileges and authority, subject, however, to the same restrictions and limitations, as have been granted and imposed upon it, for the purpose of enabling it to make a canal or slack water navigation, between the Delaware and Hudson rivers.

Also in 1824: Banking privileges granted to the D&H on November 19, 1824 (An Act Further to Amend the Act Entitled "An Act to Incorporate the President, Managers and Company of the Delaware and Hudson Canal Company," Passed April 23, 1823). Section VI of this November 19, 1824 act reads as follows: "And be it further enacted, That the banking privileges hereby granted, shall continue in force for the period of twenty years from and after the passage of this act, and no longer; and that the Legislature may, at any time, alter, modify, or repeal this act."

To attract financial investment in their enterprise, the Wurts brothers knew that they had to develop a market in New York City. Accordingly, they arranged to have shipped, by the sloop *Tripler*, from Philadelphia, on December 5, 1824, a shipment of coal. Five days later that coal arrived in New York. On January 5, 1825, a grate for burning stone coal was set up in the Tontine Coffee House (NW corner of Wall and Water Streets) in New York. Potential investors in the D&H were invited to demonstrations of the effectiveness of stone coal as a domestic and commercial fuel.

On January 7, 1825, subscription books were opened “for the purpose of receiving subscriptions to the stock of the said Company” at the Tontine Coffee House in New York, Kingston (Middle District Branch Bank), and Goshen (Orange County Bank). “The shares are one hundred dollars each, and five dollars is to be paid upon each share at the time of subscribing.” The stock was largely oversubscribed to that day. The notice announcing the opening of the subscription books is dated December 2, 1824, and is signed by Philip Hone, Lynde Catlin, Jonathan Thompson, and G. B. Abeel.

First million-dollar...

On that day, “\$1.5 million worth of shares were offered at the Tontine Coffee house in New York City. Before two o’clock in the afternoon the entire amount was subscribed. The stock attracted investors not only because of potential profits from the canal but also because the company’s charters from Pennsylvania and New York allowed it to purchase coal lands and engage in banking, too. The Delaware and Hudson’s entry into the Wyoming-Lackawanna field set a pattern of big company domination that would characterize that field throughout its history. . . / Construction [of the canal] began in July 1825. . . . The entire enterprise was notable for being ‘the largest undertaking that had ever been entered into upon the continent by any [private] corporation.’ ” (*Miller and Sharpless*, pp. 36-37, who credit Chester Lloyd Jones, *The Economic History of the Anthracite Tidewater Canals*, Philadelphia, 1908, pp. 76-78; also COP in saying what they say above.)

On January 7, 1825, the D&H Canal Company became, therefore, the first million-dollar corporation in the private sector in America. That undeniable fact which, remarkably and strangely, is not recognized by some, was recognized by Paul Browne, among a great many others, in his editorial in the *Carbondale News* of July 2, 2008.

Paul Brown supports the statement: first-million dollar corporation:

In the editorial (“Carbondale Historical Society a city, county treasure”) in the *Carbondale News* of July 2, 2008, Paul Browne, speaking on behalf of the *Carbondale News* Citizens Roundtable, begins the second paragraph of his editorial with these sentences: “Modern America started in Carbondale. The country’s first million-dollar private corporation, the Delaware and Hudson Canal Company, was started around the city’s anthracite coal resources.”

Albert G. Rutherford supports the statement: first million-dollar corporation:

In his article titled “James Archbald the Man Made the Gravity Go,” published on pp. 9-12 of the July-August-September 2012 newsletter of the Wayne County Historical Society, supports the assertion “first million-dollar corporation.” Albert G. Rutherford says: “Constructed in the 1820s, covering approximately 125 miles, and operating for seventy years, the D&H system was one of the outstanding engineering feats of the early 19th century, and the first privately financed construction project in the history of the then-young United States to cost over \$1,000,000.00.” [emphasis added]

Philip Hone supports the statement: first million-dollar corporation:

“No work of equal magnitude has been constructed in Europe or America with such limited means in so short a period and with such persevering industry.” Philip Hone, October 10, 1828

Lowenthal supports the statement: first million-dollar corporation:

“Considering that the D&H was generally conceded to be the largest private undertaking of its time, we know distressingly little about its actual construction. . .” (*Lowenthal*, p. 47)

Thomas Dickson, Lowenthal, and Chester Lloyd Jones support the statement: first million-dollar corporation:

“The D&H was probably the largest of the private canals. It is claimed that it was the first million-dollar company in America. This is another way of saying that it was the largest private enterprise of its time. Thomas Dickson, a later president of the D&H described the canal as ‘the largest undertaking that had ever been entered into upon the continent by any corporation,’ and although that assertion was made in 1875, it will stand until or unless a stronger claimant comes forward.” (*Lowenthal*, p. 62, who credits Chester Lloyd Jones, *The Economic History of the Anthracite-Tidewater Canals*, Philadelphia, University of Pennsylvania, 1908, p. 77. Note: The speech in question by Dickson was made on November 16, 1875.)

Finally, and most significantly, in support of the fact that the D&H was the first million-dollar corporation in the private sector in America, John V. Buberniak brought to the author's attention the very informative book by Jeremy J. Siegle, *STOCKS FOR THE LONG RUN The Definitive Guide to Financial Market Returns and Long-Term Investment Strategies*, 4th edition, By JEREMY J. SIEGEL (Russell E. Palmer Professor of Finance, The Wharton School, University of Pennsylvania)

Chapter 1: Stock and Bond Returns Since 1802

Part I: THE VERDICT OF HISTORY /

APPENDIX 1: STOCKS FROM 1802 TO 1870

“The first actively traded U.S. stocks, floated in 1791, were issued by two banks: the Bank of New York and the Bank of the United States.²¹ Both offerings were enormously successful and were quickly bid to a premium. But they collapsed the following year when Alexander Hamilton's assistant at the Treasury, William Duer, attempted to manipulate the market and precipitated a crash. It was from this crisis that the antecedents of the New York Stock Exchange were born on May 17, 1792. Joseph David, an expert on the eighteenth-century corporation, claimed that equity capital was readily forthcoming not only for every undertaking likely to be profitable but also, in his words, “for innumerable undertakings in which the risk was very great and the chances of success were remote.”²² Although over 300 business corporations were chartered by the states before 1801, fewer than 10 had securities that traded on a regular basis.

Two-thirds of those chartered before 1801 were connected with transportation: wharves, canals, turnpikes, and bridges. But the important stocks of the early nineteenth century were financial institutions: banks and, later, insurance companies. Banks and insurance companies held loans and equity in many of the manufacturing firms that, at that time, did not have the financial standing to issue equity. The fluctuations in the stock prices of financial firms in the nineteenth century reflected the health of the general economy and the profitability of the firms to whom they lent. The first large nonfinancial [not a bank or an insurance company] venture was the Delaware and Hudson Canal, issued in 1825 [emphasis added], which also became an original member of the Dow Jones Industrial Average 60 years later. In 1830, the first railroad, the Mohawk and Hudson, was listed, and for the next 50 years railroads dominated trading on the major exchanges.” (pp. 21-22)

The D&H was the first million-dollar corporate enterprise in the private sector in America. Many other million-dollar enterprises quickly followed, but the D&H C. Co. was the first. (January 7, 1825, \$1.5 million worth of stock sold that day at the Tontine Coffee House in NYC)

An interesting article, titled “A Reminiscence of Irving,” was published in the *Carbondale Advance*, April 25, 1885, p. 3. The article was reprinted there from the April 17 issue of the *New York Tribune*. When it was published in the *New York Tribune*, the dateline on the story was “HONESDALE, PENN, April 16.” The reminiscence was written on the occasion of the death of John P. Hone, son of Philip Hone. The article was written by “an official of the Delaware and Hudson Canal Company.” The especially interesting feature of the article is the statement of Philip Hone’s important role in the success of the D&H Canal Company: “Philip Hone, the father of John P., who was probably the courtliest Mayor that New York ever had, was the first President of the Canal Company, and it was greatly through his influence and patronage that the then greatest engineering work to be done by a private corporation ever begun in this country was carried to success.”

Here is the entire text of that article:

“A REMINISCENCE OF IRVING. / Recalling the Early History of a Great Corporation. / *New York Tribune*, April 17. / HONESDALE, PENN., April 16.—‘The death of John P. Hone,’ said an official of the Delaware and Hudson Canal Company to-day, recalls some interesting reminiscences of the early days of this company. Philip Hone, the father of John P. who was probably the courtliest Mayor that New York ever had, was the first President of the Canal Company, and it was greatly through his influence and patronage that the then greatest engineering work to be done by a private corporation ever begun in this country was carried to success. The beautiful village that sprang from the woods at the head of the canal in Wayne county, Pennsylvania, near the coal mines, was called Honesdale in his honor. In the Summer of 1841, Philip Hone, John Jacob Astor, and another eminent gentleman interested in the canal, invited Washington Irving to join them, in a junketing trip from New York to Rondout, and then by private packet from that place up the canal to Honesdale. A boat was fitted up in the most elegant manner to carry them. The trip was described, in a letter from Irving to his sister, in

glowing terms. Honesdale is situated between high hills, on a plain through which two romantic mountain streams flow, uniting in the village and forming the Lackawaxen River. There are two wide basins where the streams unite and the water is formed into two most picturesque lakes. From the eastern shore of one of these, Lake Dyberry, a solid ledge of serried and moss-grown slate rock rises almost sheer to a height of nearly 400 feet. The village itself is 800 feet above the sea level. / "This beautiful blending of rock, lake and stream elicited many expressions of delight from Washington Irving, and he insisted on scaling the rocky height in order to study the surrounding scenery. The entire company climbed to the summit by a circuitous course. The delight of Irving was so great when he reached the summit—from which the country for a hundred miles around is spread beneath the eye—that Philip Hone insisted that the ledge be known as Irving Cliff, and that Washington Irving christen it as such. This he did by breaking a bottle of champagne on the rock. A maple bordered road extending along the base of the cliff, between it and the water, Irving named Ladywood Lane, a name it bears to this day. / "Some of the appreciative people of Honesdale, a year ago, resolved to commemorate the visit of Irving by erecting on the site a great Summer hotel, and after nearly a year's work the immense castellated building, adding nearly another hundred feet to the height of the cliff, and extending all along its summit, is about completed, and will be thrown open to the public, with appropriate ceremonies, early in the Summer. It will be known by the great Irving's name."

Several important births in 1824:

1824: "Thomas Dickson, President of the Del. & Hud. C. Co.; R. M. Olyphant, Vice President; Coe F. Young, General Manager; A. H. Vandling, Superintendent of Coal Department; R. Manville, Superintendent of the Pennsylvania Railroad Division; E. W. Weston, Real Estate Agent, were all born in 1824, the year the first shovelful of earth was turned to commence the Del. & Hud. Canal. This is a very remarkable and singular coincidence.—*Honesdale Citizen.*" (*Carbondale Leader*, December 9, 1881, p. 4)

D&H Officers and Managers 1825:

March 8, 1825: the date of the complete organization of the D&H. The stockholders met in New York and elected the following officers and managers: President, Philip Hone; Treasurer, Samuel Flewwelling*; Managers, John Bolton, Philip Hone, Garrett B. Abeel, Samuel Whittemore, Hezekiah B. Pierpont, Rufus L. Lord, Benjamin W. Rogers, John Hunter, Thomas Tileston, William W. Russell, William Calder, Henry Thomas, William H. Ireland. On March 11, 1825, Philip Hone (age 44) was elected president of the D&H, John Duer, counselor, and, on the following day, John Bolton, treasurer.

*On the resolution dated March 23, 1830, passed by the Legislature of Pennsylvania, relative to the Delaware and Hudson Canal Company, the treasurer of the D. & H. Canal Company signed his name: "S. Flewwelling, Esq., Treasurer, D. & H. Canal Company."

Philip Hone

Philip Hone was the first president of the D&H. He served from March 11, 1825 to January 21, 1826. He remained on D&H Board of Managers until his death on May 4, 1851.

John Bolton

John Bolton was the second president of the D&H. He served from January 21, 1826 to April 9, 1831.

4. April 1, 1825: Pennsylvania legislature authorized D&H Canal Company to succeed to the rights of Maurice Wurts and others to improve the navigation of the Lackawaxen River (No. 1, above) and its branches. It was the passage of this act that made possible the acquisition of full control of both the canal and mining operations. For the proposed sum of \$40,000 and deferred stock amounting to \$200,000 the Wurts' Brothers interests were at last merged with those of the Delaware and Hudson Canal Company. Here, then, is the text of the law that authorized the D&H Canal Company to succeed to the rights of Maurice Wurts and others to improve the navigation of the Lackawaxen River and its branches.

CHAPTER 78. LAWS 1825.

A SUPPLEMENT TO THE ACT ENTITLED "AN ACT TO IMPROVE THE NAVIGATION OF THE RIVER LACKAWAXEN."

Preamble.

WHEREAS, by an act entitled "An act to improve the navigation of the river Lackawaxen," Maurice Wurts, his heirs or assigns, is authorized to improve the navigation of the said stream: And whereas, by an act of the Legislature of the State of New York, a company has been incorporated, by the name of "The President, Managers and Company of the Delaware and Hudson Canal Company," to make a canal from the Hudson to the Delaware river, terminating at a point near the mouth of the Lackawaxen; and whereas, the stock in the said company having been jointly subscribed by the citizens of the two states, and the improvements authorized by the said acts being essentially connected with each other, the citizens of Wayne and Pike counties have, by petition, represented to the legislature that it is desirable that those engaged in the improvement of the Lackawaxen should be able to avail themselves of the assistance of the Delaware and Hudson Canal Company, and pray the legislature to grant the necessary legislative facilities for that purpose:

THE THEREFORE,

Authority of
the company
to improve the
Lackawaxen.

Power to hold
land.

SEC. 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania, in general assembly met, and it is hereby enacted by the authority of the same, That, by and with the consent of Maurice Wurts, his heirs or assigns, it shall be lawful for "The President, Managers and Company of the Delaware and Hudson Canal Company" to improve the navigation of the river Lackawaxen, and any one of its branches, in the manner authorized and provided by an act entitled "An act to improve the navigation of the river Lackawaxen," passed the thirteenth day of March, one thousand eight hundred and twenty-three; and, after the making of such navigation, the said company shall and may hold and enjoy the same, as fully and effectually as Maurice Wurts, his heirs or assigns, might or could do, under and subject, however, to all the provisions, conditions, restrictions, duties and obligations imposed by the said act on the said Maurice Wurts, his heirs or assigns, and under and subject to the conditions, restrictions and limitations hereinafter provided; and it shall further be lawful for the said company to purchase and hold any quantity of lands, situate at any place within ten miles of the waters of the Lackawaxen, not exceeding five thousand acres: *Provided, however,* That in any judicial proceeding instituted against the said company, within the jurisdiction of this state, the service of process upon any toll gatherer, or other known agent of the said company, in the proper county, shall be as good and as available in law as if served upon the president of the company.

Tolls.

SEC. 2. And be it further enacted by the authority aforesaid, That the toll which the said company may exact, under the provisions of the act to which this act is supplementary, shall not, in the whole, exceed the rate of one cent and one-half per ton, per mile, on the ascertained burthen or capacity of any ark, boat or craft laden with or engaged in the transportation of stone coal; and the said company shall not exact any higher toll than is above provided for, on such arks, boats or craft, laden as aforesaid, on the works erected by them on the Delaware, between the mouth of the Lackawaxen and Carpenter's Point; *Provided*, The said arks, boats or craft laden as aforesaid, shall have come down the said river Lackawaxen, and proceed down the said river Delaware, and not through the canal to be made through the state of New York, between the Hudson and Delaware, by the said company.

Works on the Delaware river, how constructed.

SEC. 3. And be it further enacted by the authority aforesaid, That the said company shall not erect any works, or make any improvements connected with the Delaware river, unless the same shall be so constructed as to leave the channel of the said river as safe and as convenient for the descent of rafts as it now is; and any boat or craft ascending the natural channel of the Delaware river, from any point or place below Carpenter's Point, or descending the same to Carpenter's Point, from any place above the mouth of the Lackawaxen river, shall be permitted to pass, toll free, through any locks which the said company may erect between Carpenter's Point and the mouth of the Lackawaxen river. And it shall

further be the duty of the said company, at each and every place where their works may be connected with the river Delaware, to erect a lock, or locks, and keep lock tenders, so as to provide for the ascent and descent of boats and craft, as aforesaid, and without delay.

SEC. 4. And be it further enacted by the authority aforesaid, That it shall not be lawful for the said company to engage, either directly or indirectly, in the business of banking or of manufacturing within the jurisdiction of this State; nor shall this act or any part of it, be deemed or construed to recognize or admit an exclusive jurisdiction by the State of New York, over the waters of the Delaware river, between Carpenter's Point and the northern boundary of this State; and if it shall appear to any future legislature of this State, after full examination by competent engineers, to be appointed by the legislature, who shall declare, in their report, the fact that the channel of the river is by any of the said works or improvements rendered less safe and convenient for navigation, as aforesaid, it shall be lawful for such legislature to repeal this law and the privileges by this act granted shall be thereby absolutely determined.

Banking and manufacturing prohibited.

SEC. 5. And be it further enacted by the authority aforesaid, That the property of the said company, whether real or personal, within this State, shall, at all times be liable for its debts, and subject to taxation, in like manner as similar property held by an individual or by a corporation, now is or may be; and the said company shall, under oath or affirmation of the President and Treasurer, report to the legislature, when required so to do, the amount of capital which it may have invested within this State, under pain of forfeiting the rights and privileges hereby granted for neglecting or refusing so to do; and moreover, the State of Pennsylvania shall, at all times, by its agent or attorney, duly appointed, have a right to examine the books, accounts and vouchers of the said company in relation to such reports.

Jurisdiction and navigation of the Delaware river.

Liability to debts and taxation.

To make report.

SEC. 6. And be it further enacted by the authority aforesaid, That this act shall be of no force or effect, unless "The President, Managers and Company of the Delaware and Hudson Canal Company," shall, under their corporate seal, notify the Governor of this State of their acceptance of the same, on or before the first day of July next.

Notice to governor.

SEC. 7. And be it further enacted by the authority aforesaid, That if the said company shall misuse or abuse the privileges hereby granted, the legislature reserve the right to repeal this act.

Penalty on abuse of this act.

The D&H managers then hired Benjamin Wright to oversee construction of their canal; Wright chose as his assistant John B. Jervis. The Canal route was laid out.

Benjamin Wright (1770-1842), an American civil engineer who served as Chief Engineer of the Erie Canal. He was born in Wethersfield, CT in 1770, and moved with his family to Rome, NY, at the age of 19, in 1789. He became a surveyor. In 1816 funding for the Erie Canal was in place,

and in 1817, Wright was named Chief Engineer. After completion of the Erie Canal, in 1825, Wright was approached by the Wurts brothers of Philadelphia to survey a possible route from the coalfields of Northeastern Pennsylvania to the Hudson River, where anthracite could be shipped by boat downriver to New York City. Benjamin Wright was hired by the D&H. May 21, 1825: Benjamin Wright submitted his report: build a canal to Honesdale and a railroad from Carbondale to Honesdale. On June 2, 1825, Benjamin Wright was appointed chief engineer, effective from April 15, to oversee construction of the canal. Wright insisted that the locks on the D&H Canal be made of stone. On March 14, 1827, Benjamin Wright resigned and John J. Jervis was named chief engineer. Benjamin Wright / John Jervis: The Erie Canal production team, who were hired by D&H to design the canal and Gravity Railroad.

Canal notes: In the Erie Canal, originally, there were 83 locks used to raise and lower the boats in the 363-mile long canal (the Niagara River and the Great Lakes are 570 feet above sea level). The Suez Canal is about 100 miles long; the Panama Canal, about 50 miles long.

John B. Jervis

On March 14, 1827, chief engineer Benjamin Wright resigned, and John B. Jervis (who had served as assistant engineer) was named Chief Engineer, at a salary of \$4,000 yearly. He served as Chief Engineer, 1827-1829. On April 4, he was directed to survey and locate a railroad route from the proposed terminus of the canal (near Dyberry Forks) to the anthracite mines at Carbondale. He did so that summer. The plan for the Gravity Railroad was submitted by John B. Jervis (1795-1885) to the D. & H. C. Co. on October 22, 1827 and submitted to the Board two days later. Construction of the road began in 1827 and was completed in June of 1829. The construction cost was \$3 million. John Jervis designed the Gravity Railroad that opened on October 9 1829.

July 13, 1825: Philip Hone, president of the new company and mayor of New York, turned the first shovelful of earth in the construction of the canal at Summitville, Sullivan County, NY, about midway between Port Jervis and Kingston. Later that same month, the first contract for the construction of 16 miles of the Canal known as the Summit Level was signed.

On the question of the growth of the D&H from its small beginnings in 1823 to the centennial of its existence, we read, in *Century of Progress* (p. 593), the following:

“The growth that has been achieved by the company from such small beginnings seems marvelous. During its earlier years of desperate struggle for successful existence this growth was often interrupted and the final progress was made possible only by consistent courage, indomitable energy, broad vision and persistent economies. The company has enjoyed the maximum of careful management, in aid of which the expanding use of anthracite and the increasing population of the country have played their conspicuous parts.”

January 21, 1826: Philip Hone submitted his formal resignation as President of the D&H, having been recently selected Mayor of the City of New York. He remained on the Board of Directors until his death. John Bolton elected President on January 21, 1826, served 1826-1831.

5. April 5, 1826: Railroad authorized by Pennsylvania legislature from coal beds to Honesdale

Here is the text of that law:

CHAPTER 67. LAWS 1826.

A FURTHER SUPPLEMENT TO THE ACT ENTITLED "AN ACT TO IMPROVE THE NAVIGATION OF THE RIVER LACKAWAXEN," passed March 13, 1823.

SEC. 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania, in General Assembly met, and it is hereby enacted by the authority of the same, That it shall be lawful for the President, Managers and Company of the Delaware and Hudson Canal Company, to construct and maintain such railways or other devices as may be found necessary to provide for and facilitate the transportation of coal to the canal by them to be constructed: *Provided*, That no railway hereby authorized to be made, shall be extended further than from the coal beds owned by the said company, to the forks of the Dyberry, on the west branch of the river Lackawaxen; or from the coal beds aforesaid to that point on the Wallenpaupack branch of the river Lackawaxen where it is crossed by the Easton and Belmont turnpike road; and, the better to effect that object, when it shall be necessary for the said Company to occupy and use any land or materials, and the parties cannot agree in relation thereto, the same course shall be pursued as is authorized and provided by the fourth and fifth sections of the act to which this act is a supplement.

May construct and maintain railways.

Power to occupy land, &c.

SEC. 2. And be it further enacted by the authority aforesaid, That every such railway or device shall be so constructed by the said company as not to obstruct or impede the free use of any public or private laid out road or highway, which may cross or enter at the same; and in all places where such railroad or device may cross, or in any way interfere with any road as aforesaid, it shall be the duty of the said company to enable all persons travelling such road as aforesaid, to cross or pass such railway or device by a causeway, or some other suitable and convenient means to be provided and maintained by the said company; and if the said company shall neglect or refuse to provide such causeway or other suitable means, or, where provided, to maintain the same in good repair when required by the parties interested, they shall be liable to pay a penalty of ten dollars for every day the same shall be so neglected, or refused to be provided or maintained, to be recovered by the supervisor of the township, or by the turnpike companies, as the case may be, with costs, for the use of the township, or of such companies, as debts of like amount are, by law, recoverable; and shall, moreover, be liable to an action or actions at the suit of any person who may be aggrieved thereby; and the service of process upon any officer or agent of the said company shall be as good and as available in law as if served upon the president thereof.

Shall not obstruct public or private roads.

To erect and maintain a causeway, or other suitable device.

Penalty on neglect.

SEC. 3. And be it further enacted by the authority aforesaid, That for the accommodation of all persons owning or possessing lands through which any such railroad or device may pass, it shall be the duty of the said company, when required by the occupant of such land to make or cause to be made a good and sufficient causeway, or provide other suitable means, whenever the same shall be necessary, to enable the occupant of such land to cross or pass over the same with wagons, carts and implements of husbandry, as occasion may require: *Provided*, however, That the said company shall in no case be required to make, or cause to be made, more than one such causeway or passage through each plantation or lot of land, or two, if a second should be found necessary for the accommodation of any one person possessing land through which any such railway or device may pass; and if the said company shall neglect or refuse to provide such causeway or passage, or to keep the same in good repair, the said company shall be liable to pay any person aggrieved thereby all damages sustained by such person in consequence of such refusal or neglect, to be sued for and recovered before any magistrate or any court having cognizance thereof; and the service of process on any officer or agent of said company shall be as good and as available in law as if served on the president thereof.

Company to erect and maintain causeways over the road where it passes through private property.

Penalty on neglect.

SEC. 4. And be it further enacted by the authority aforesaid, That if any person or persons shall wilfully and knowingly break, injure or destroy any railroad or device, or any part thereof or any work

Penalty on any person injuring the road, &c.

appurtenant thereto, erected under the provisions of this act, he, she or they so offending, shall forfeit and pay to the said company three times the actual damages sustained, to be sued for and recovered, with costs of suit, by action of debt before a justice of the peace, or any court of competent jurisdiction, in the name and to the use of the said company.

A public
highway.

Tolls.

SEC. 5. And be it further enacted by the authority aforesaid, That the said railway shall be deemed and taken as a public highway; and it shall and may be lawful for the said company, or such persons as they may from time to time appoint toll collectors, or their deputies, so soon as the railroad shall be perfected, to collect and receive by toll upon the said railroad, a sum not exceeding twelve per centum per annum upon the amount of moneys which shall have been expended in the construction of the said railroads and other devices, and in the support, improvement and continuance of the same; and to prescribe the form and kind of carriages, wagons and conveyances to be used thereon for the transportation of persons or commodities.

JOSEPH RITNER,
Speaker of the House of Representatives.

ALEXANDER MAHON,
Speaker of the Senate.

APPROVED—the fifth day of April, one thousand eight hundred and twenty-six.

J. ANDW. SHULZE.

Summary Statement

Creating the legal entity known as the Delaware and Hudson Canal Company and making it possible for that company to mine and market anthracite coal:

Here is a summary statement of the legislation needed by the D&H (1) to have an uninterrupted corridor between the Hudson River and the headwaters of the Lackawaxen, (2) to succeed to the rights of Maurice Wurts and others to improve the navigation of the Lackawaxen River, and (3) to construct a railroad from the coal fields to Honesdale:

1. **March 13, 1823:** Pennsylvania legislature passed an act that authorized Maurice Wurts and others to canalize the Lackawaxen River and its branches.
2. **April 23, 1823:** New York legislature passed an act to incorporate "The President, Managers and Company of the Delaware and Hudson Canal Company." This New York law gave the Wurts brothers the authority (1) to open water communication between the Delaware River and the Hudson River (to construct a canal from Rondout on the Hudson River to Saw Mill Rift on the Delaware River) and (2) to purchase coal lands and to transport stone coal to the city of New York and elsewhere in the state of New York.
3. **April 7, 1824:** The April 23, 1823 act passed by the New York legislature that incorporated the D&H C. Co. in New York was now amended (1) to authorize subscriptions to the capital stock up to the sum of \$1,500,000, and (2) to make it possible for the D&H to make a canal or slack water navigation along the New York side of the Delaware River from Carpenter's Point (near present-day Port Jervis), on the Delaware River, or from near that point, to the mouth of the Lackawaxen River. This was the third link in the chain that the parties concerned needed in order to have an uninterrupted corridor between the Hudson River and the headwaters of the Lackawaxen River.
4. **April 1, 1825:** Pennsylvania legislature authorized D&H Canal Company to succeed to the rights of Maurice Wurts and others to improve the navigation of the Lackawaxen River (No. 1, above). It was the passage of this act that made possible the acquisition of full control of both the canal and mining operations. For the proposed sum of \$40,000 and deferred stock amounting to \$200,000 the Wurts' Brothers interests were at last merged with those of the Delaware and Hudson Canal Company.
5. **April 5, 1826:** Pennsylvania legislature authorized a railroad from the coal beds to Honesdale.

March 14, 1827: chief engineer Benjamin Wright resigned, and John B. Jervis, who had served as assistant engineer, was named chief engineer, at a salary of \$4,000 yearly.

April 4, 1827: Jervis was directed to survey and locate a railroad from the proposed terminus of the canal, near Dyberry Forks, to the mines at Carbondale. On October 22 he presented a report, which was submitted to the Board of Directors on October 24. He recommended a double-rail rail road; timber rail capped by iron plates of rolled iron—not cast iron; five planes each having an ascent of from one hundred and twenty to two hundred and five feet, separated by short lines of levels of moderately declining road; chains not hemp ropes to pull the cars up the planes; five stationary steam engines at a cost, inclusive of the expense of procuring water, of \$24,500 in all; for the descent from the summit to Honesdale and to retard motion on the three steep descending grades, he proposed a simple contrivance of sails so connected with the gearing as to hold the cars to a low and safe velocity; for the nearly level distances—about 11 miles—between the planes the use of seven steam locomotives of 6 or 7 tons was advocated; inclusive of railroad iron, bridges and machinery for stationary power, Jervis estimated the cost of the railroad would be \$178,228.13; 320 railroad waggons would be needed to transport 540 tons of coal daily, and estimated the daily cost of operation as \$159.32, a per ton cost of 29.5 cents or 1.8 cents per ton mile. Jervis concluded his report with these words: “Successful accomplishment will form a new era in the internal improvements of our country.” [emphasis added] (*COP*, pp. 43-46)

Jervis' plan for braking on the down planes:

“His [John Jervis] ingenuity was particularly apparent in his devising of a supplemental braking system for use on inclined planes. A trip of loaded cars would already be slowed somewhat in its descent because the chain to which it was attached would run up to a pair of large drums on the stationary steam engine, around the drums several times (in the fashion of a double-pulley), then back down the incline where it would be attached to a trip of empty cars. As the loaded cars descended, their weight would pull the empty cars up the plane, and the resistance supplied by the empty cars would partly check the fall of the loaded cars. To slow them more, Jervis designed what he called a ‘pneumatic convoy.’ Descriptions of this device vary, but most sources agree that it amounted to a 12-foot fan with eight blades, standing upright, geared to one of the stationary steam engine drums so that as the drum turned, it turned the fan at an even faster rate. As air resistance had a braking effect on the fan’s moving blades, the effect was transferred to the drum, then to the chain wrapped around it, and ultimately to the descending coal cars. For good measure, Jervis also instructed that at least one coal car in each trip be equipped with a conventional friction brake.” (*Ruth*, p. 13)

John Jervis designs the railroad:

In designing the railroad from Carbondale to Honesdale, Jervis did his homework and studied the designs of the rail lines then in existence.

Philip Ruth, (pp. 11-12) gives very good information on this question. What were the rail lines then in existence?

In early 1827, Abraham Pott operated a short, mule-drawn ‘tramway’ at his mine in Port Carbon, PA.

Also in 1827, in Quincy, MA, there was a road of rails, three miles long, from a granite quarry to a Neponset River dock. This railroad was built to transport granite for the Bunker Hill Monument. Jervis went to Quincy and had a look. The rails on this road were of wood and capped with a rolled-iron strip, which was smoother than cast iron and also required fewer joints than cast iron.

Also in 1827, Jervis went to Mauch Chunk and studied the rail line there, which was 9 miles long, between the Lehigh Coal and Navigation Company’s Summit Hill coal mines and the Lehigh River at Mauch Chunk. On this rail line, the loaded cars coasted down from the mines and the empties were drawn back up the plane by mules.

Also, Jervis studied the published information on the Hetton Colliery, which opened in England in 1822. That rail line consisted of short, inclined planes over hilly sections. The rail cars were initially cars pulled up and let down the planes on ropes that were attached to horses. Later, stationary steam engines were put at the heads of the planes. On level or nearly level stretches, the cars were pulled by the latest technological marvel, steam locomotives. The Hetton Railroad, was seven miles and five furlongs long and extended from the town of Sunderland, on the river Weir, to the Hetton collieries. It overcame an elevation of 812 feet.

The plan of the Hetton Railroad was important and influential in Jervis' thinking when he designed the D&H Gravity Railroad. *Mathews* (p. 234) notes, appropriately: “A profile of the Hetton Railroad bears a striking resemblance to that of the Honesdale and Carbondale Railroad. It was published in the *Franklin Journal* late in 1825 and in a Philadelphia daily newspaper in January, 1826, together with a view of the locomotive and ‘train of chalder wagons.’”

This point is seconded by *Ruth* (p. 12) who remarks: “Detailed information regarding this railroad [the Hetton Railroad] was available to Jervis by the time he received orders to proceed with his railroad in early 1827. William Strickland’s *Reports on Canals, Railways, Roads, Etc.*, prepared for the Pennsylvania Society for the Promotion of Internal Improvements, had been published in Philadelphia a year earlier [1826]. In it, Strickland described what he had observed while visiting the Hetton Colliery in 1825: stationary engines at the heads of the planes carry cars

both ways; the ropes that pull the cars are supported by rollers on the planes; some of the planes more than a mile long; planes either single or double tracked, if single, then there must be a passing siding in the plane."

As is well known, when the railroad designed by John Jervis opened in 1829, there were many similarities between it and the Hetton Railroad. The rail cars were not pulled up the planes by ropes on Jervis' railroad, rather, they were pulled by chains. Jervis' decision to use chains and not ropes was reversed, as is well known, within a few months of the opening of the D&H Gravity Railroad.

Where did the early D&H railroad workers live?

Some of them surely lived at Mrs. Gilligan's boarding house. Mrs. Margaret Gilligan, "the mistress of the first boarding house that was erected for [D&H] company employees in our town," died on July 14, 1880. Here is her obituary, which was published in the July 17, 1880 issue of the *Carbondale Advance*, p. 3:

"GILLIGAN—In this city on the 14th inst., Margaret, wife of Mr. John Gilligan, after a short illness, in the 80th year of her age. / Deceased, accompanied by her husband, lost sight of her native land on the 27th day of May, 1827, and after a long voyage, landed at Quebec, Lower Canada. After a short stay at the latter place, they proceeded to the United States. Mr. Gilligan, being desirous of obtaining steady employment and learning that the Del. & H. C. Co. had broken ground for their canal and railroad, he hastened to the scene of action where he was employed by Mr. Townsend, one of the contractors, then engaged in constructing the canal. His first work was at Rondout, then along the entire line to Honesdale. It was while working upon the last section, at Honesdale, that Mr. Townsend made a proposition to Mrs. Gilligan to take charge of a large boarding house, which he anticipated building at 'Barrendale,' the name of our present city. Only a few weeks after the proposition was made, Mrs. Gilligan was performing the duties of mistress of the first boarding house that was erected for company employees in our town. She has resided here ever since, and was never known to have any serious illness until within the last few weeks. It then became apparent that her disease has assumed a dangerous form and although everything was done that could be thought of to impede its progress, she sank rapidly and died on Wednesday last at four o'clock in the morning. She was a devoted and steadfast friend. Her ear was ever open to the call of charity, and her hand ever ready to relieve the wants of the suffering. No trouble or distress was ever brought to her knowledge without enlisting her sympathy and generous aid. Her skill as a nurse made her the general favorite in her neighborhood. Her simple yet effective remedies were as often applied to the adult as to the little infant. But we shall meet her no more. The place of wife and mother, which she so well filled, must forever remain vacant. Yet the reflection that here on earth she lived a self-sacrificing life, one so worthy the title of Christian, and her last moments so full of confidence in the mercy of

God, that the exchange must indeed be a happy one. Her husband and three daughters remain to mourn her loss and have the sympathy of a host of friends who should never forget to pray for the noble and generous soul that has gone from amongst them. May it rest in peace. / P." (*Carbondale Advance*, July 17, 1880, p. 3)

Interesting side note:

On February 18, 1828: first recorded sale of D&H C. Co. stock on New York "Stock and Exchange Board" (10 shares at \$76 per share).

Original specifications for the railroad—not yet in operation:

"The railway is to be furnished with five stationary engines and seven locomotive steam engines. It is estimated that the railway and its appendages will transport 540 tons per day in one direction. The steam engines were taken up as soon as the canal was navigable and it is expected that the railway will be in operation as early as June next." (*Dundaff Republican*, December 20, 1828)

2902

John Jervis' Plan for the \$3 million Gravity Railroad

John B. Jervis was named Chief Engineer of the D&H on March 14, 1827. On April 4, he was directed to survey and locate a railroad route from the proposed terminus of the canal to the anthracite mines at Carbondale. He did so that summer. The plan for the Gravity Railroad was submitted by John B. Jervis (1795-1885) to the D. & H. C. Co. on October 22, 1827 and submitted to the Board two days later. Construction of the road began in 1827 and was completed in June of 1829. The construction cost was \$3 million.

Jervis' plan for braking on the down planes:

Philip Ruth, p. 13: "His [Jervis'] ingenuity was particularly apparent in his devising of a supplemental braking system for use on inclined planes. A trip of loaded cars would already be slowed somewhat in its descent because the chain to which it was attached would run up to a pair of large drums on the stationary steam engine, around the drums several times (in the fashion of a double-pulley), then back down the incline where it would be attached to a trip of empty cars. As the loaded cars descended, their weight would pull the empty cars up the plane, and the resistance supplied by the empty cars would partly check the fall of the loaded cars. To slow them more, Jervis designed what he called a 'pneumatic convoy.' Descriptions of this device vary, but most sources agree that it amounted to a 12-foot fan with eight blades, standing upright, geared to one of the stationary steam engine drums so that as the drum turned, it turned the fan at

an even faster rate. As air resistance had a braking effect on the fan's moving blades, the effect was transferred to the drum, then to the chain wrapped around it, and ultimately to the descending coal cars. For good measure, Jervis also instructed that at least one coal car in each trip be equipped with a conventional friction brake."

Work on the Canal Moves Forward

1827-1828: Construction of the canal went ahead rapidly. Difficult construction problems were encountered at the Hawks Nest on the Delaware River and at the Narrows on the Lackawaxen, where the canal passed steep rock cliffs.

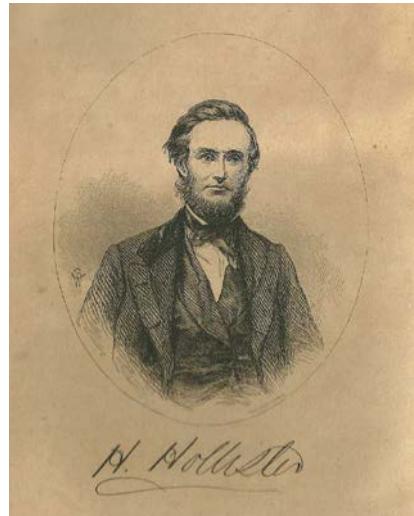
2903

Canal Now Open, Railroad to Open in the Spring

"We have the pleasure to state, that the Delaware and Hudson Canal, is now in successful operation, between Honesdale and its junction with the Hudson. / It is expected that the Rail Road from Honesdale to Carbondale, (at the Coal Mines) a distance of 16 miles, will be in successful operation early in the Spring." [emphasis added] (*Dundaff Republican*, December 18, 1828, p. 3)

Two important facts about corporate management that are associated with the building the D&H Canal and Gravity Railroad are brought forward by H. Hollister in the Preface to *History of the Delaware and Hudson Canal Company* (1880, unpublished typescript in the holdings of the D&H Canal Historical Society and Museum, High Falls, NY; typescript shown—and scanned pdf copies made available—to members of the Delaware and Hudson Transportation Heritage Council by Bill Merchant, (president of the Delaware & Hudson Canal Historical Society at High Falls, NY, at the quarterly meeting of the DHTHC on April 24, 2013 at the National Park Service Corwin Farm Site, Town of Lumberland).

Before we look at those two facts, let's have a look at Hollister himself. The likeness given below of the man is given the cover page of the pdf-format copy of his 1880 work in the holdings of the D&H Canal Historical Society and Museum at High Falls:



Those two facts about D&H management, from the very beginning of the company, are: (1) the D&H encouraged domestic manufactory in every possible manner, and (2) the company rewarded monthly labor with monthly pay.

Here are Hollister's words, on page ii of the *Preface* of his history of the D&H:

"In revisiting the operations of the Company during the half century of its existence, there are two facts which stand out in honorable prominence, first the policy of encouraging domestic manufactory in every possible manner, and second the plan instituted of rewarding monthly labor regularly by monthly pay. Long credit was always accorded to all in Northern Pennsylvania without hesitancy or reluctance and payments for labor or merchandise sometimes were deferred indefinitely by force of habit or otherwise, until the coal hills smote successfully by these pioneers, as the rock was smote by the prophet in olden times, reversed this order of things into twelve regular pay days per year, greatly to the advantage of trade, working men and others. The salutary influence upon the country of this innovation can hardly be appreciated at the present time."

On October 16, 1828, the packet boat "Orange" left Rondout with many notable personages on board, bound for Honesdale. This was the first boat to navigate the entire canal.

December 5, 1828: ten boatloads of "Lackawaxen anthracite" arrived at Rondout over the canal and were transferred to the sloop "Toleration," which arrived in New York City five days later. This was the first shipment of anthracite coal through the newly-completed D&H Canal.

Four years earlier, the "Toleration" had been a part of early D&H history: When the D&H, in December 1824/January 1825, set up a grate in the Tontine Coffee House in New York in which to demonstrate to the public the "fine burning qualities of Lackawaxen Coal," it was the sloop

"Toleration" that had transported to New York from Philadelphia—the coal arriving in New York on December 10, 1824—the small quantity of anthracite coal that had been rafted to Philadelphia, for that purpose. When the subscription books for the purchase of stock in the Delaware & Hudson Canal Company were opened, on January 7, 1825, in the Tontine Coffee House—which had been warmed for the occasion by using Lackawaxen coal—all of the company's stock was sold by 2 P.M. that day.

At the head of the brochure/flyer titled "*Upper Delaware / Delaware and Hudson Canal*" that was produced by the National Park Service, U. S. Department of Interior, Upper Delaware Scenic and Recreational River, we read: "The Delaware and Hudson Canal was the first canal in this nation built as a private enterprise [emphasis added]. Constructed from 1825 to 1829—with 16 miles of gravity railway and 108 locks over a 108-mile canal—it was built to transport anthracite coal from mines in northeastern Pennsylvania to markets on the Hudson River. Competition from railroads closed the D&H Canal system in 1898, after 70 years of operation."

The D&H Canal, an inland riparian canal, followed the banks of four rivers: the Lackawaxen River until it met the Delaware River at Lackawaxen. The boats then crossed the Delaware and followed the New York shore of the Delaware River to Port Jervis. From Port Jervis the canal turned eastward, following the Neversink Creek and then the Rondout Creek to the Hudson River. It cost \$6 million to build the D&H Canal (\$10,000 per mile).

The first boats to pass through the canal carried ten tons of coal. It was not until 1839 that a full head of water—four feet—could be kept in the canal. Beginning in 1840, with 4 feet of water, boats carrying 30 tons of cargo could pass through the canal without grounding. In September 1842, it was decided to raise the height of the embankments to maintain 5 feet of water (work completed in the spring of 1844). This would make it possible for boats to carry 40 tons of cargo. New 40-ton boats were built to replace the 'flickers,' as the first boats were called. At this time the flickers that were still in use on the canal were "hipped" (their sides were raised) to increase their capacity. Another enlargement was undertaken in 1845: 5 ½ feet of water, making boats of 50 tons capacity possible. Given the increased capacity of the canal, a new configuration of the railroad was necessary to keep pace with the increased capacity of the canal. This was accomplished under the direction of James Archbald in the period 1842-1845. By 1847, the 40-ton boats were, like the 30-ton boats before them (the flickers), also hipped. The demand for anthracite could still not be met by the D&H. In 1847, 55-ton capacity boats were added. On November 17, 1847, the managers of the D&H approved R. F. Lord's recommendation that the Canal's depth be increased to 6 feet. In December 1847 this enlargement was begun. Roebling built the aqueducts: the two new ones (Delaware and Lackawaxen) were first used at the beginning of the boating season, April 26, 1849; the replacements over the Neversink and the Rondout were ready for use when the 1851 season opened. Still larger boats were built, which meant that new locks had to be constructed throughout: new locks were 100 feet long and 15 feet wide (the six Summitville locks were slightly wider). The original 1828 locks were 76 feet long and nine feet wide. The new locks were, with 6 exceptions, on the same locations as the old ones. With the Delaware and the Lackawaxen aqueducts now operational, locks 1, 2 and 3 on the Lackawaxen were no longer needed and were eliminated, and Locks 70, 71, and 72 were added

to connect the New York end of the Delaware aqueduct with the canal on the New York side of the Delaware River. The six feet of water in the canal that was provided for in the 1847 enlargement did not become a reality until July 28, 1853. By this time there were many different kinds of boats on the canal, with the total number being just over one thousand. There were, in addition, 495 large boats operating for the Pennsylvania Coal Company.

2904

Constructing the Gravity Railroad

Construction of the Gravity Railroad was begun in 1827 and completed early in the summer of 1829, at a total cost of \$3million.

The first three "railroads" in America:

1. Bunker Hill Railway (1826)

2. Mauch Chunk Rail Road (1827)

3. D&H Canal Company Gravity Railroad (1829): "The road in question [the D&H] was the first of any general commercial importance ever built in this country, and inaugurated the economical system of inclined planes since adopted by engineers whenever practicable. Up to the 8th of August, 1829, there were only 12 miles of railroad in operation in America—three miles of a five-foot gauge road running from the Quincy granite quarries to the Naponsett River in Massachusetts, and the novel 'mule road,' nine miles in length, connecting the Summit Hill Coal Mines, back of Mauch Chunk, with the Lehigh River. . . / The intention of the company had been to open the road and canal, and celebrate the running of the locomotive [the Stourbridge Lion] on the Fourth of July, 1829, but the work was delayed so that it was not ready for use until the 1st of August. The locomotive had arrived on the 23d of July." ("The First Locomotive. Its Trial Forty-Eight Years Ago. . . " *The New-York Times*. From Our Own Correspondent. Honesdale, Penn., Aug. 8, 1877)

1. Bunker Hill Railway: opened on October 7, 1826

Constructed to transport granite from Quincy to Boston for the Bunker Hill Monument. This was the first commercial railroad in the United States functioning as a common carrier.

In a letter to the editor, dated June 2, 1904, by Henry V. Poor to the editor of *The Sun* (in which Poor cites a portion of a February 9, 1901 letter that he received from Mr. Stuyvesant Fish, president of the Illinois Central Railroad, the occasion being the fiftieth anniversary of the incorporation of that company), we read: "The railroad first undertaken in the United States was a short line, worked by horse power, of about three miles, for the transportation of granite to the Neponset River, near Boston. This road was simply a copy of the tramroads already in use in England. It is important only as the pioneer in the great movement that was then taking place."

(Poor's letter reprinted in the June 3, 1904 issue of a Carbondale newspaper; clipping in one of the Gritman scrapbooks in the archives of the Carbondale Historical Society)

The Bunker Hill Railway was a tramroad, with wooden rails, over which traveled horse-drawn cars. On this rail line, 3 – 3 ½ miles long, the rails were five feet apart, of pine, a foot deep, covered with an oak plate, and these were overlaid with flat bars of iron. The whole was built with granite sleepers, seven and a half feet long, laid eight feet apart.

On September 30, 1826, Benjamin Wright endorsed a railway from the mines at Carbondale to the forks of the Dyberry in Honesdale. On April 4, 1827 the D&H directors authorized a survey for the proposed rail line from Carbondale to Honesdale. John Jervis, the chief engineer, was responsible for planning an effective mechanical system to move the coal as well as the task of laying out the route. He presented his plans for the D&H railroad in a report to the D&H managers in October 1827.

Bunker Hill: the Battle and the Monument

Battle of Bunker Hill, the first major battle of the American Revolution, was a tactical victory for the British. It was fought on June 17, 1775 (most of the fighting took place on nearby Breed's Hill, which is why the monument was built on Breed's Hill rather than on Bunker Hill). The colonial forces (strength: about 1,500; casualties: 139 killed, 314 wounded, 30 captured (20 POWs died) were commanded by Colonel William Prescott ("Don't fire until you see the whites of their eyes!"), General Artemas Ward, and Major General Israel Putnam; the British forces (strength: 3,000 est.; casualties: 268 killed (including 19 officers), 826 soldiers wounded (including 62 officers) were command by General Thomas Gage. The army of colonists put up a strong fight, wounding or killing nearly half of the British. The colonial revolutionaries lost the battle, but the fight they staged was to be long remembered.

Bunker Hill Monument: the first obelisk built in the United States; it was designed by Solomon Willard; cornerstone laid on the 50th anniversary of the battle, June 17, 1825 (The Marquis de Lafayette, who was on a 14-month tour of the United States, laid the cornerstone.); monument completed in 1842 (capstone was laid on July 23, 1842) and dedicated on June 17, 1843 (dedicatory speech by Daniel Webster). The monument: made of Quincy granite, 221 feet tall, 31 feet square at the base and 15 at the top.

Bunker Hill monument, 1900



2. Mauch Chunk and Summit Hill Switchback Rail Road: opened on May 5, 1827

Mauch Chunk and Summit Hill Switchback Rail Road, built and owned by the Lehigh Coal & Navigation Company, this was the second railroad in the United States (and the first coal road.) Construction began in January 1827 on an existing road and the road opened on May 5, 1827. This was a 9-mile long gravity railroad in Pennsylvania that went between Mauch Chunk, now Jim Thorpe, and Summit Hill. It sent anthracite from company mines up at Summit Hill to the company's coal chutes in Mauch Chunk on the Lehigh River, and on to the Lehigh Canal for delivery to points south. The return trip was handled by mules, who then rode the trains downhill. Thus, downhill cars covered the trip in just half an hour, while the uphill trip took four hours. The trains were sometimes up to fourteen cars long, hauling 25 short tons (23,000 kg) of anthracite. A return track, or back-track, from Mauch Chunk to Summit Hill was completed in 1845. The back track consisted of two planes, Mount Pisgah and Mount Jefferson, to deliver the cars to the tops of their respective hills. The ride from Mt. Pisgah to Mt. Jefferson was almost 7 miles. A barney car, connected to steel bands from an engine house atop the hill, pulled the cars uphill and gravity took over from there. The ride up the Mt. Pisgah plane was over 2,300 feet while Mt. Jefferson was just over 2,000 feet. The distance between the planes was nearly 7 miles and the ride from Mt. Jefferson into Summit Hill was less than 1 mile.

This view given below, titled “Looking down Mt Pisgah. Switch Back,” is of an original photo card in the collection of the Carbondale Historical Society and Museum:



1871: [Published in the November 18, 1871 issue of the *Carbondale Advance*, p. 2, is the following: **"The Anthracite Coal Fields.** / We copy the following interesting description of the Luzerne Coal Region from the correspondence of Forney's *Press*: / . . . The anthracite coal trade of Pennsylvania is commonly said to have begun at Mauch Chunk in 1820. This is a mistake. In the year 1807 Abijah Smith, of Plymouth, a township below here on the opposite side of the river, purchased an 'ark,' commonly used for the transportation of plaster, loaded it with fifty tons of coal, and later in the season floated it down to Columbia, in Lancaster Co. This was probably the first cargo of anthracite coal that was ever offered for sale in this or any other country. . . . During the year 1813 Mr. Abijah Smith and his brother sold through their agents in New York \$2,691.20 worth of coal. It was sold by the chaldron, containing about thirty-six bushels, being retailed at twenty-five dollars per chaldron. . . . Anna." (*Carbondale Advance*, November 18, 1871, p. 2)

3. Delaware and Hudson Canal Company Gravity Railroad: opened October 9 1829

Work on the construction of the Gravity Railroad (1827-June 1829) was put under contract on November 25, 1827. The work was under the supervision of engineers John B. Mills (nine contractors and crews) and James Archbald (eleven contractors and crews). From *Ruth*, p. 17, we learn: In all, 31 contractors and crews worked at building the railroad between March 1828 and June 1829. "Account books show that six primary contractors used over 300,000 linear feet (more than 56 miles) of lumber in building trestles and tracks for the railroad. [John Torrey said that trestles supported about one-third of the length of the railway.] Another ten miles of beams were used as 'bracing.' Jervis' design called for tracks to be constructed of 6 x 9-inch hemlock

cross ties, laid every ten feet, with 6 x 12 inch rails affixed to them. The rails were to be set in slots cut into the ties so that they maintained a width (or gauge) of 4 feet, 3 inches. Iron strap rails, 2 1/4 inches wide and half-inch thick, were to be used upon the wooden rails, and screwed to their inside edges to serve as a wearing surface."

When Horatio Allen was in England, he ordered strap rails from W. and I. Sparrow of Wolverhampton. Allen also ordered and purchased in Liverpool chains for use on the planes.

2905

John Raymond Built the First Mile of the Gravity Railroad

On the final page of the chapter (pp. 131-154) on the D&H in J. A. Clark's *The Wyoming Valley*. . . (1874) is the following account of the life of John Raymond, who built the first mile of D&H track in the third decade of the nineteenth century:

"It is fitting, in concluding the chapter on the Delaware & Hudson Canal Company to mention one more item of history. As already stated, this company placed the first locomotive engine upon the track on the American continent. The man who built the first mile of track is still living and a resident of Scranton, familiarly and favorably known by nearly every citizen of the Lackawanna Valley, as Uncle John Raymond, the veteran of the war of 1812. / John Raymond was born June 13th, 1795, in the town of Walton, Delaware County, N. Y. He attended school until he was eleven years old, when he went into the store of Gardner & St. John in his native town, remaining there five years, after which he went with his father to New York city, where he entered a dry goods store on Division street. The war breaking out he accompanied his father on his return to Walton, where young Raymond set at the trade of carpenter and joiner, working at it until he was twenty-three years old. Ohio was then the Far West and thither he sought his fortune. / In the meantime drafting for the war was in operation at his home, wherein his father was liable for duty. Young John went to the Captain of the company and asked to go in his father's place which was granted. He served three months in the service, and is at present the only pensioner in the city of Scranton, on the rolls of that war. / The contract for the building of the road as previously announced, having been let, the first mile from Honesdale out, was taken by Hiram Plumb and himself and built by them, Mr. Raymond being on the ground personally to superintend the work [emphasis added]. He was there when the strange looking monster arrived to be placed on the track, and recalls with vividness each particular circumstance connected with the trial trip. / Another important event in his life in connection with the company is the fact that he rode with Mr. Maurice Wurts for two weeks consecutively, besides making extra trips, endeavoring to procure signers to the petition, asking legislation aid. / He moved to Salem Corners next, where he carried on a mercantile business for ten years, residing there nineteen years, after which he took up his residence in Archbald in 1854, remaining there three years, then he moved to Scranton and purchased his present residence, 1104 Franklin avenue, just above Spruce street. / Mr. Raymond is a favorite with Scranton people, and considering his years, is a remarkable man. His memory is excellent; his perceptions keen, and his judgment still unabated. With the soldiers of the late war he is held in high esteem, and his presence at their gatherings is always accompanied with a cordial and enthusiastic greeting."

Just for the record:

In P. A. Philbin's paper that he read at the reunion of The Gravity Men's Association on September 4, 1915, he says: "Professor White, in his excellent address last year [1914], told you of the primitive construction of the old Gravity track . . ." It would be interesting to read a copy of Professor White's address.

As we noted above, work on the construction of the Gravity Railroad was under the supervision of engineers John B. Mills (nine contractors and crews) and James Archbald (eleven contractors and crews).

In his talk on the Gravity Railroad in Archbald on May 13, 2013, Ed Casey correctly noted that James Archbald was in charge of building the D&H Gravity line to Archbald as well as the Pennsylvania Coal Company's Gravity line in 1850, but he was not in charge in 1829 when the D&H Gravity Railroad was built, as Casey said he was. The 1829 line was built under John Jervis' direction. James Archbald, however, was the engineer in charge of eleven of the crews that constructed the 1829 configuration.

James Archbald:

James Archbald came to Carbondale in 1828, at the request of John Jervis, who was named Chief Engineer of the D&H in 1827. Archbald had previously worked for Jervis in the construction of that portion of the Erie Canal that passed through the area where the Archbalds lived in upstate New York. Archbald was named superintendent of the mines and resident engineer of the Gravity Railroad by John Jervis. Archbald served as Chief Engineer, 1829-1850. For the first 21 years of the railroad's operation, James Archbald was surely one of the most important people on the managerial level of the D&H.

Hugh Brown was one of the eleven contractors, under James Archbald's direction, who built the 1829 configuration of the Gravity Railroad. This we learned, on October 29, 2012, from the Brown - Gibson Family Papers in The University of Iowa Libraries, Iowa City, Iowa (a collection of 23 letters, 3 documents, 1 printed item, and 3 miscellaneous pieces by Hugh Brown, his wife Mary Gibson Brown, their children and family, written from New York, Iowa, and other places in the United States, and from Scotland.). This collection was brought to our attention by John V. Buberniak on October 29, 2012.

From those papers we learn that Hugh Brown (1776-1847) was born in Ayr, Scotland and emigrated (at age 44) to the United States about 1820, and established a farm in the Mohawk River Valley, where, other families from Ayrshire, Scotland had earlier settled, among them the parents of James Archbald and family, who settled there in 1805. Brown's wife, nee Mary Gibson (1798-1877), and their children born in Scotland joined Brown in America in 1823. Surely the Brown family and the Archbald family knew each other in what must have been a Scottish community in the Mohawk River Valley.

Some background: After completion of the Erie Canal, in 1825, Benjamin Wright was approached by the Wurts brothers of Philadelphia to survey a possible route from the coalfields of Northeastern Pennsylvania to the Hudson River, where anthracite could be shipped by boat downriver to New York City. Benjamin Wright was hired by the D&H. May 21, 1825: Benjamin Wright submits his report: build a canal to Honesdale and a railroad from Carbondale to Honesdale. On June 2, 1825, Benjamin Wright was appointed chief engineer, effective from April 15, to oversee construction of the canal. On March 14, 1827, Benjamin Wright resigned and John J. Jervis was named chief engineer. Benjamin Wright / John Jervis: The Erie Canal production team, who were hired by D&H to design the canal and Gravity Railroad.

In 1825, from the Mohawk River Valley in upstate New York, Benjamin Wright, John B. Jervis, and James Archbald all began work for the D&H in Carbondale.

One of the eleven contractors under the supervision of James Archbald was Hugh Brown, who was surely brought here (Carbondale), very probably in 1827, through his acquaintance with James Archbald.

From the Brown-Gibson papers we learn that Hugh Brown was employed as an overseer by the Delaware & Hudson Canal Company in the period 1827-1830. This we know from Letter No. 6 in Box 1 in the Brown-Gibson papers. In that letter, dated December 20, 1830, John B. Jervis (also a Scot) and James Archbald certify that Hugh Brown "has been the last three years employed on the Delaware & Hudson Canal and Railroad as an overseer for the Company." In addition, Jervis and Archbald certify that Brown is of good character and that he has done good work for the D&H and that they, therefore, recommend him highly.

John Bloomfield Jervis served as Chief Engineer of the D&H, March 14, 1827—1829. In 1829, James Archbald took over as Superintendent and Resident Engineer of the Gravity Railroad.

Brown surely must have remained here, after 1830, working continuously for the D&H. In March 1833, he was still working an overseer of railroad construction here. This we know from Letter 8 in Box 1, of the Gibson-Brown papers, dated March 24, 1833, from Hugh Brown to his wife. In that letter he speaks of his work as an overseer of railroad construction and speaks of the difficulties that he is having with the other foreman.

Hugh Brown was here (Carbondale) in 1836. This we know from Letter 9 in the Brown-Gibson papers. This letter, from John Gibson (Hugh Brown's wife's father) in Black Rock, NY, dated January 12, 1836, was sent to Brown in care of James Archbald in Carbondale.

Hugh Brown was living in Carbondale on April 4, 1838. Letter 10: John Gibson, Canajoharie, [New York], April 4, 1838, to Hugh Brown, Carbondale. 2pp.

Hugh Brown was living in Carbondale in June, 1840. Letter 11: John Gibson, Medina, New York, June 16, 1840, to Hugh Brown, Carbondale. 1 1/2pp.

Hugh Brown was living in Carbondale on April 14, 1841. Letter 12: John Gibson, Medina, April 14, 1841, to Hugh Brown. 1 1/2p.

Hugh Brown's certificate of naturalization, among the Brown-Gibson papers, is dated, Bethany, PA, September 3, 1841.

What was the Hugh Brown/James Archbald connection: They were both Scots (Brown was born in 1776, James Archbald in 1793, both in Ayrshire, Scotland). If they did not know each other in Scotland, they surely did when both lived in the Mohawk River valley in upstate New York. When James Archbald came to Carbondale to work for the D&H, he knew that there would be a need here for his Scottish colleagues to work for the company—in administrative capacities. Hugh Brown came to Carbondale and worked for the D&H.

2906

Early Descriptions of Canal and Railroad

"The Delaware and Hudson canal commences at Kingston on the Hudson river, and runs over to the Delaware river, through the valley of the Neversink Creek, thence up the valley of the Delaware to the Lackawaxen creek, and up that creek to the front of the railway. This is a continuous canal of 117 miles in length, and was completed from the Delaware to the Hudson last autumn, and it is expected the whole line will be completed by July, 1828; the railway commences at the terminus of the canal, end [sic] runs over Moosick mountain to the coal mines on the Lachawannah creek in length 16 miles, overcoming an elevation of 858 feet. Seven locomotive steam engines will be employed on three planes, and five stationary engines and brakers are used. are graduated at 5 deg. The railway and all its appurtenances, will be all completed in 1828, at an estimated expense of \$178,005. The cost of each locomotive engine, about \$1,900, and weight about 6 tons." (*Dundaff Republican*, March 20, 1828, p. 3)

"One hundred thousand dollars five per cent State Stock, issued on account of the Delaware and Hudson Canal Company, were sold at New York on Friday at auction, by Messrs. Hone and Sons, for a premium of 7 3/4 per cent." (*Dundaff Republican*, March 27, 1828, p. 3)

Hollister, unpublished typescript, 1880, p. 39:

"The Railroad was calculated to transport 540 tons of coal per day or 129,000 tons per year of 200 working days and it was expected that this new way of transporting coal to Honesdale would surpass any turnpike or wagon methods."

Another Early Description of the D&H Canal and Gravity Railroad (which had not yet been completed), published in the *Dundaff Republican*, January 1, 1829, p. 2:

"The public seem scarcely aware that a canal, *one hundred and six miles in length*, commencing at the tide water near Kingston, and terminating at Honesdale, in Pennsylvania, has been completed since July, 1825 [later in the article we read that the canal is now being completed],

and that this great work has been accomplished principally by the enterprise and perseverance of an individual company. As the channel for conveying coal to the navigable waters of the Hudson, this canal must be regarded as an improvement of incalculable importance to the public; if not of indispensable necessity, in supplying the exhaustion of fuel occasioned by the great increase of steam engines. / The first squadron of boats loaded with coal, arrived at tide water on the 5th instant. [This article was originally published in the *Albany Argus* in December 1828, and so 'the 5th instant' here means 'December 5, 1828'] Fifty tons of this coal have been consigned to the Messrs. Townsends, which will afford our citizens an opportunity of testing its qualities. / From gentlemen who have recently been through on the whole line of the canal, we learn that the work has been executed in the most permanent manner, and that in its construction, durability and economy are judiciously combined. This canal is 32 to 36 wide, upon the water line, and has 4 feet depth of water. The locks are 76 feet in length between the gates, and 9 feet wide. The boats are estimated to carry 25 to 30 tons. / From the mouth of the Rondout, where it connects with the Hudson, to Port Jervis, near the Delaware River, is a distance of 59 miles; on this section are 60 lift locks and one guard lock, of hammered stone, laid chiefly in hydraulic cement. There are also one aqueduct over the Neversink river 224 feet in length, upon stone piers and abutments, one over the Rondout entirely of stone upon two arches, one of 60 and the other of 50 feet chord; and ten others, of various dimensions, upon stone piers and abutments, over lateral streams; 15 culverts of stone, and 93 bridges having some abutments and wing walls. / Port Jervis is less than a mile from Carpenter's Point, formed by the junction of the Neversink and Delaware rivers, and at which point, the states of New York and New Jersey, corner upon Pennsylvania. Port Jervis affords a view of the territory of three states, and also of the Delaware river and the fertile valley of the Neversink. / From this point, the line of the canal is carried along on the east side of the Delaware, to a point opposite the mouth of the Lackawaxen river. At this place a dam has been erected across the Delaware, by means of which the canal is fed, and boats cross the river. From M'Carty's point, which is formed by the junction of the Lackawaxen with the Delaware, the canal follows up the valley of the Lackawaxen, 25 miles, to the forks of the Dyberry, at which point the canal terminates, and where a thriving village is already established, called Honesdale. / In the Delaware section of 22 miles, there are 13 wooden locks, and on the Lackawaxen section of 25 miles, are 37 locks of the same description. These locks are secured by a substantial dry stone wall, and so constructed that the wooden lining can be taken out and replaced, without disturbing the rest of the lock. / Honesdale, where the canal terminates, is 16 miles distant from the coal region. Over this 16 miles, the coal is to be transported upon a rail road, which is already in great forwardness [emphasis added]. The structure of the rail road is of timber, with iron plates securely fastened to the timber rails with the screws. It is estimated that this rail road and its appendages will transport 540 tons per day, in one direction.—The steam engines for the rail road were taken up as soon as the canal was navigable; and it is expected the rail road will be in operation as early as June next.* [emphasis added] / The rail road terminates at Carbondale, on the Lackawanna river, where several hundred tons of coal have already been quarried, and transported to the canal by the teams employed in conveying materials for the rail road. / The coal on the Lackawanna has been tested, and proves to be of the best quality for working iron, as well as for ordinary purposes of fuel. As to quantity, there can be no reasonable doubt on the subject. A visit to Carbondale, and the coal regions in its vicinity,

will satisfy any person that the supply is inexhaustible. And the canal being now completed, and the rail road nearly finished, [emphasis added] our cities and villages bordering upon the Hudson may congratulate themselves upon the facilities offered by this great highway for obtaining an inexhaustible supply of fuel.—*Albany Argus.* / *In the short paragraph which appeared in our last, we committed an error, which we take this occasion to correct. The stationary engines for the Rail Road were not imported; they were made by Messrs. Abeel & Dunscomb of this city [Albany].” (*Dundaff Republican*, January 1, 1829, p. 2)

The completed D&H Canal (from a poster in the collection of the Pike County Historical Society at Milford, PA):

"As completed in 1828, the D&H Canal was 32 feet wide at the water line, 20 feet wide at the bottom, and 4 feet deep. It had 108 locks, 22 aqueducts, 136 bridges, 22 reservoirs, 16 dams, and 14 feeders. The locks were originally 76 feet long and 9 feet wide. The dimensions of the early canal and its appurtenant structures restricted passage to boats of about 30 tons burden. Between 1842 and 1851, the canal was almost totally rebuilt in several stages to be 48 feet wide at the water line, 32 feet wide at the bottom, and 6 feet deep. Locks were then increased in size to 100 feet long and 15 feet wide (some a bit wider), the number of locks remaining the same but the locations differing in some cases. The original aqueducts were also widened or replaced. The final major canal reconstruction allowed the passage of boats carrying up to about 140 tons. An important component of the 1848-1851 work was the erection of four large suspension aqueducts designed by John Roebling. Two of these—the Lackawaxen and Delaware Aqueducts—were new (see Poster 4), and two replaced original stone-arch aqueducts across the Neversink River and Rondout Creek. / Ninety-five of the locks were of the composite type, consisting of a cut-stone and rubble walls and wood lining and 13 were of dry-laid, cut-stone masonry. Most of the locks had a 10-foot lift, but some—notably those at High Falls—had +/- 12.5-foot lifts. / A factor in the rapid completion of the canal—only three years for construction at a time of pick and shovel labor and black powder—was the discovery of natural hydraulic cement in the vicinity of High Falls and Rosendale. [There are 7,688 cubic yards of hydraulic cement masonry in the Delaware aqueduct.] These Silurian-age Rosendale cement beds (exploited until about 1970) greatly facilitated construction of locks and aqueducts on the D&H by eliminating the necessity of transporting cement from sites in similar age rocks along the Erie Canal in central New York.

1839: First year that a full-head (4 ft) of water could be put into the canal (due to the porous nature of the banks). 'Thirty-ton' boats could now pass from Honesdale to Rondout without fear of grounding.

1842 (November): Work commences on deepening the canal to a full five feet, thus raising boat capacity to 40 tons. The enlargement is completed in the spring of 1844.

1847 (December): The second, and last, great enlargement of the canal—to a depth of 6 feet—begins. Most larges [sic, possibly 'barges'] are enlarged, and John Roebling is engaged to build

several large aqueducts. When completed in 1850, this enlargement allows passage of loaded boats weighing 140 tons.

1848-1851: Roebling constructs new suspension aqueducts across the Lackawaxen and Delaware Rivers, and built replacements for smaller aqueducts across the Neversink River and Rondout Creek."

Hollister, unpublished typescript, 1880, pp. 40-41:

"Up until the completion of the Railroad twenty or thirty teams were engaged in carrying coal from the mines to the Canal at \$2.20 per ton on sledges; at \$2.75 on wheels. Teams carried from one to two tons each. While the boatmen and lock-tenders were in training for their respective duties this tedious manner of transporting coal for fifteen miles was relied upon. It cost the Company \$5.15 per ton at tide water. The season was so far advanced that only 7,000 tons of coal found its way to market during the year 1829—considerably less than is carried now [1880] in a single day over the same route. And even in the second year of the operations of the Delaware and Hudson Canal Company, the railroad, worked to its utmost capacity, only carried 43,200 tons of coal over the mountain. In other words the entire amount of coal carried over this road every four days is greater than the entire shipment in the year 1830. Twelve thousand tons of coal have, in a single day, been carried over this route after the road had been rendered more efficient by many improvements made upon it by Mr. James Archbald."

2907

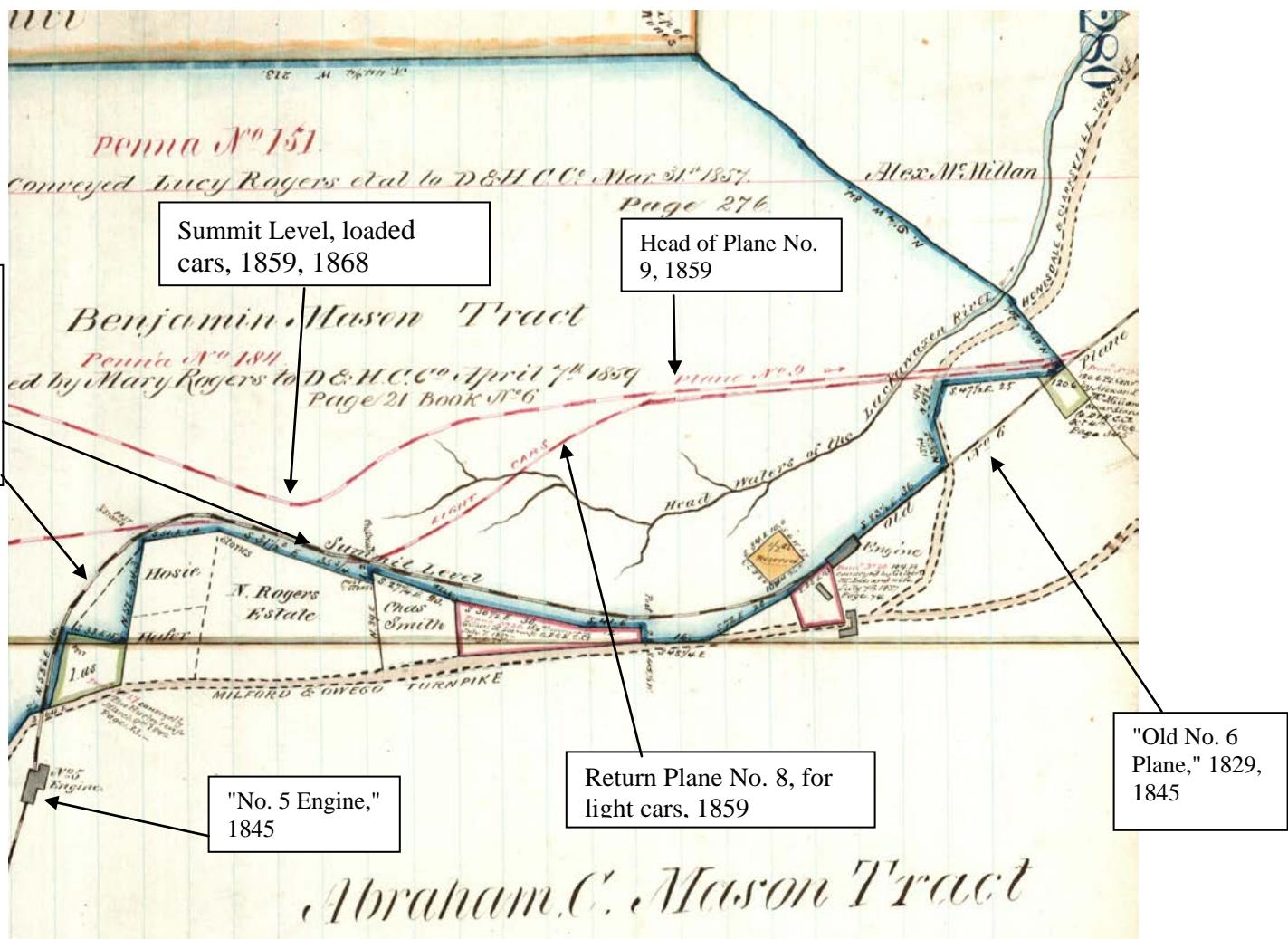
Roadbed: Carbondale to Honesdale

When the Gravity Railroad opened on October 9 1829, there were five single-tracked inclined planes (each with a turn-out of perhaps two hundred feet in length in the middle of the plane) between the valley floor in Carbondale and the summit of the Moosic Mountain above Carbondale. The planes were on a gradient of about fifteen to twenty per cent. At the head of each of these planes there was a stationary steam engine. These planes were separated by levels, on which horses pulled the loaded cars, from the head of one plane to the foot of the next.

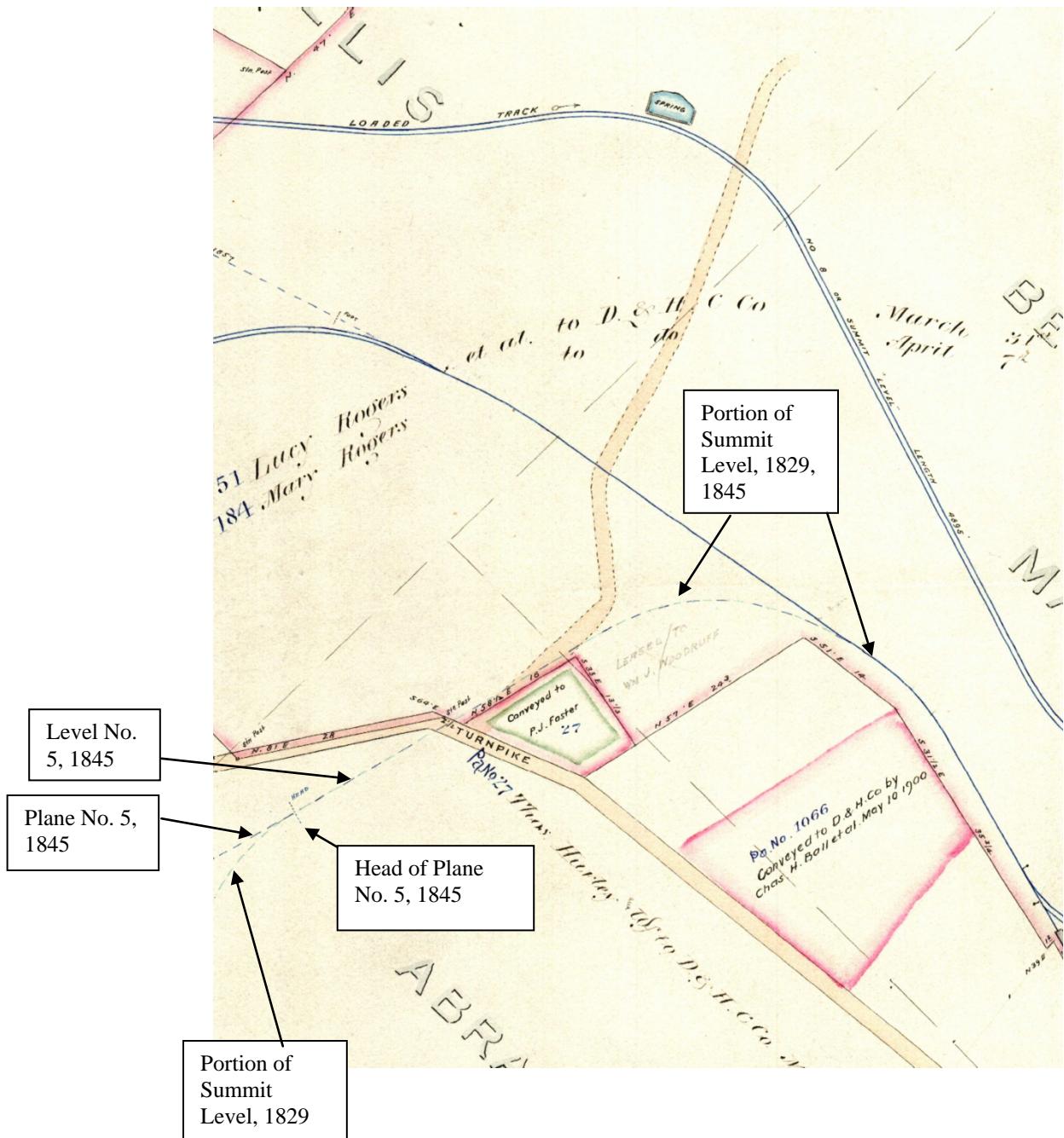
On the top of the Moosic Mountain there was a long level, Level No. 1 (the "Summit Level"), that was 9,250 feet long (1 ¾ miles). This level was on a descending grade of 8 feet to the mile, "crossing the turnpike about ¾ of a mile west of the present [1886] 'light track' summit. . . On the Summit Level one horse could not draw more than two loaded cars at a time. (*History of Wayne, Pike and Monroe Counties, Pennsylvania* by Alfred Mathews, 1886, p. 236).

The final portion of the 1829 Summit Level—which ran from the Head of Plane No. 5 to Farview, mostly on the right hand side of the highway as you head towards Honesdale, but it crossed the highway just before it swung to the East, headed towards Farview—is shown on the detail given below on the map that illustrates the release, dated August 11, 1856, between Henry Edgett / Horatio N. Edgett and The Delaware and Hudson Canal Company. That release is given on page 274 of D&H Deeds PA; the map on page 275. On this map, it is marked in black ink "Summit Level" (which ended at the head of Plane No. 6, 1829, 1845). On the map given below,

we see in the lower left corner "No. 5 Engine." From that point to the head of Plane No/ 6 (marked "Old No. 6 Plane" on the map below) was the final portion of the 1829 Summit Level. The "No. 5 Engine" that we see marked on this map is the engine from the 1845 configuration. Most interestingly, the placement of No. 5 Engine in the 1845 configuration is exactly at the point where the 1845 configuration (No. 5 Engine) and the 1829 configuration (the Summit Level) intersected. In other words, in 1845 a new route for Planes 4 and 5 was established from just below No. 4 Pond to the summit of the mountain at this point, which is exactly the point where No. 5 engine house was established in 1845. From this engine house, Level No. 5 (graded downhill, West to East, in 1845 extended to the head of No. 6. Remarkably, then, in 1845, No. 5 Level was largely made up of what, in 1829, the final stretch of the Summit Level. This final stretch of the 1829 Summit Level would also get used again, in 1859, when it became a part of the return track on Plane No. 8 (for light cars).



The placement of No. 5 Engine in 1845 on the 1829 Summit Level, most remarkably, is indicated on the following detail from the 1895 Gravity Railroad map volume (collection of the Lackawanna Historical Society, Scranton, PA) that is given below.



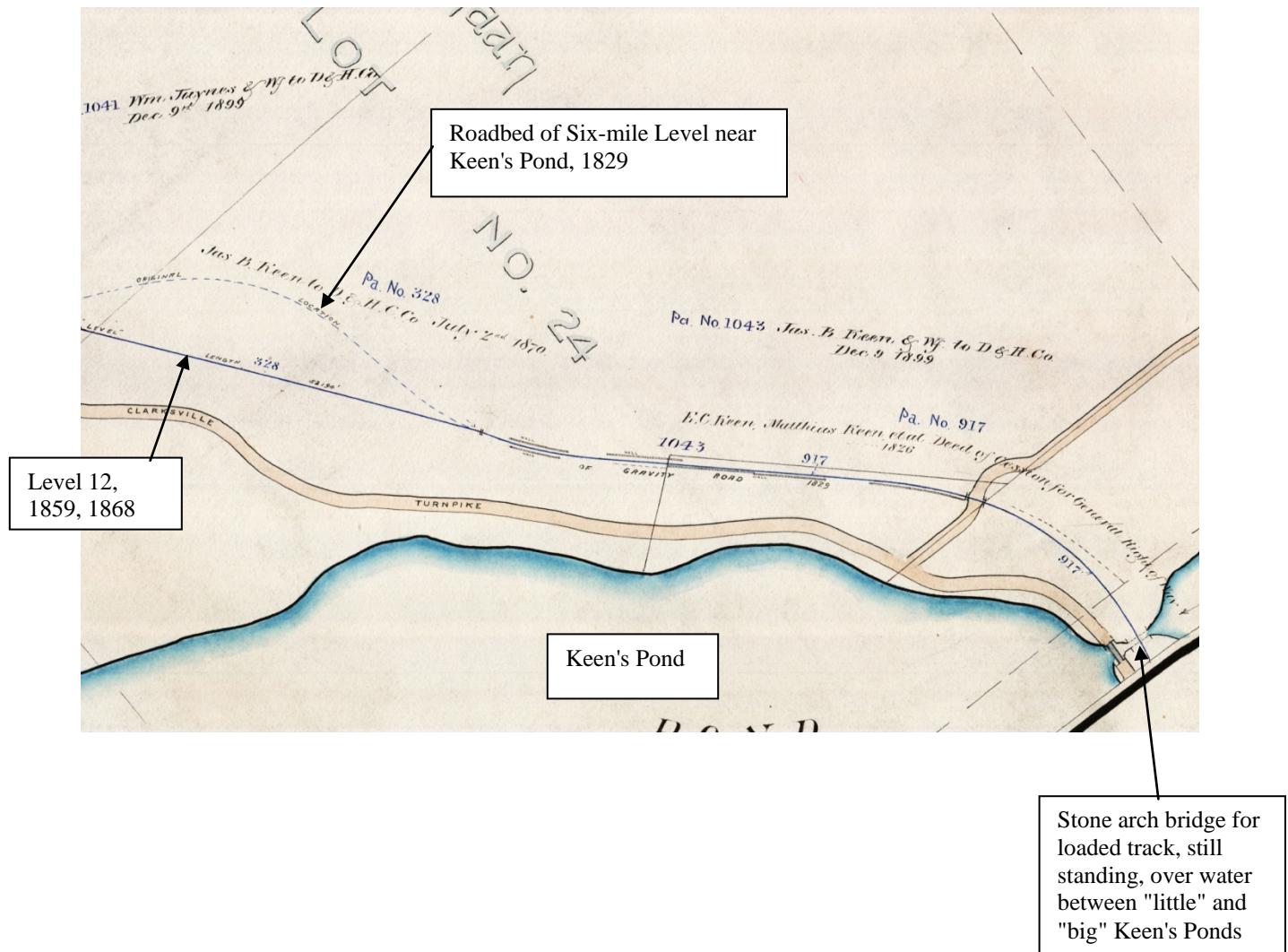
On the east side of the mountain, at Farview, there were two inclined planes, Planes 6 and 7, down which the loaded cars traveled by gravity, without the use of steam. "Old No. 6 Plane" from the 1829 and the 1845 configurations is shown on the map above that illustrates the release, dated August 11, 1856, between Henry Edgett / Horatio N. Edgett and The Delaware and Hudson Canal Company. That release is given on page 274 of D&H Deeds PA; the map on page 275.

The movement of the loaded cars down these two planes, and also down Plane No. 8 at Prompton, is described by N. H. Hiller as follows:

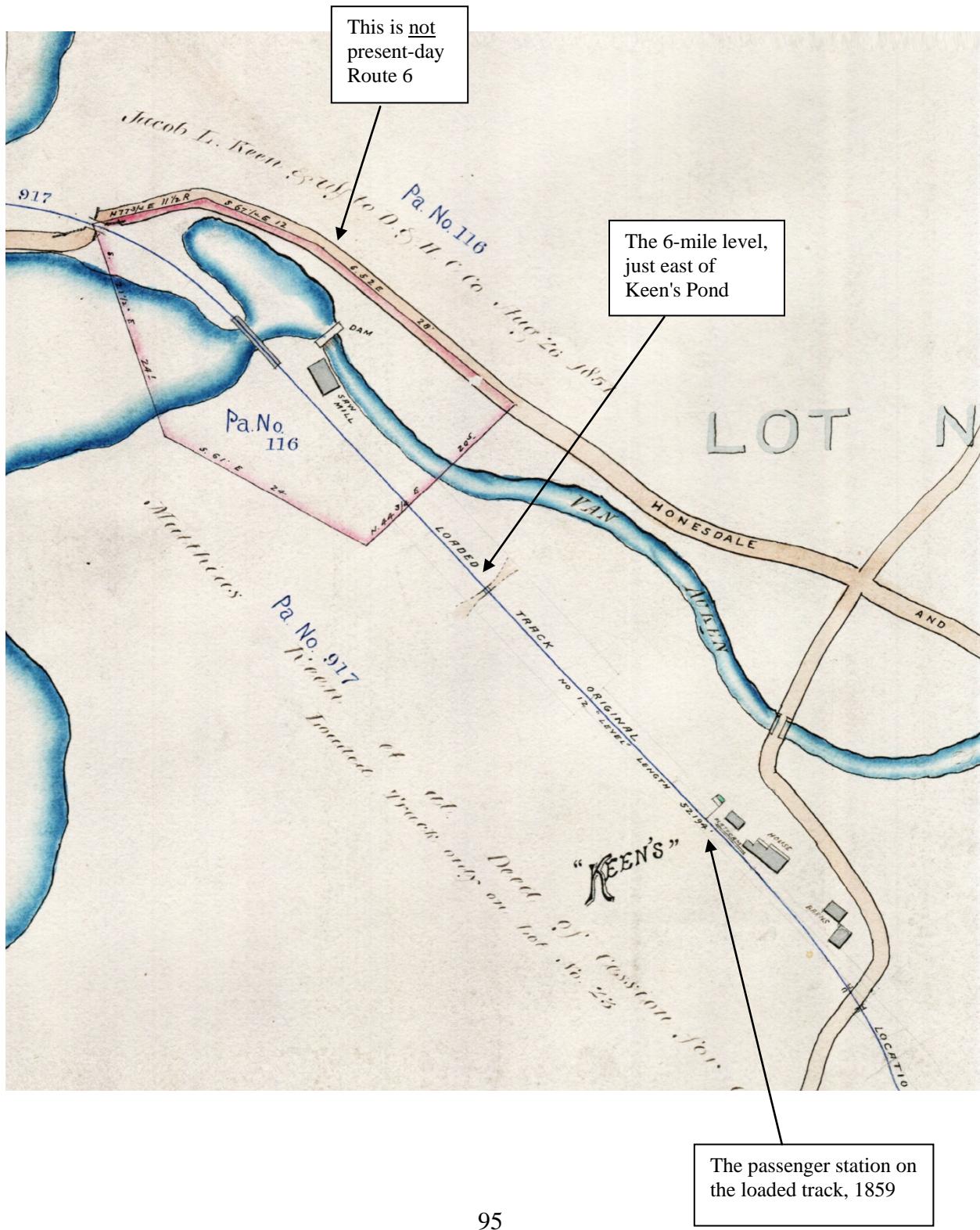
"Here, since the loaded trip was going down, energy had to be dispelled by means of some sort of brake, and the simplest form of brake was utilized. The winding drum was connected to a large fan by a train of gears with the fan speed eight times that of the drum. These fans were like water wheels, ten feet in diameter with ten blades three feet wide and from six to eight feet long. The fans absorbed the energy easily and regulated the speed on the down trips to about fifteen miles an hour. Of course, the light trips on the return from Honesdale were drawn uphill by the loaded trips descending."

Once down the Moosic Mountain, the cars, traveled down the Six-mile Level by gravity to Prompton, where they were let down Plane No. 8, in the same manner as on Planes 6 and 7, to the Four-mile Level, down which the cars, five at a time, were drawn by a horse to the Canal basin in Honesdale. When the loaded cars went down the Six-mile Level, horse cars carried the horses that would pull empties back up that level. One horse could pull five empties back up the Four-mile Level; one horse could pull four empties back up the Six-mile Level.

The portion of the Six-mile Level in the area of Keen's Pond is seen in the detail from the 1895 Gravity Railroad map volume given below:



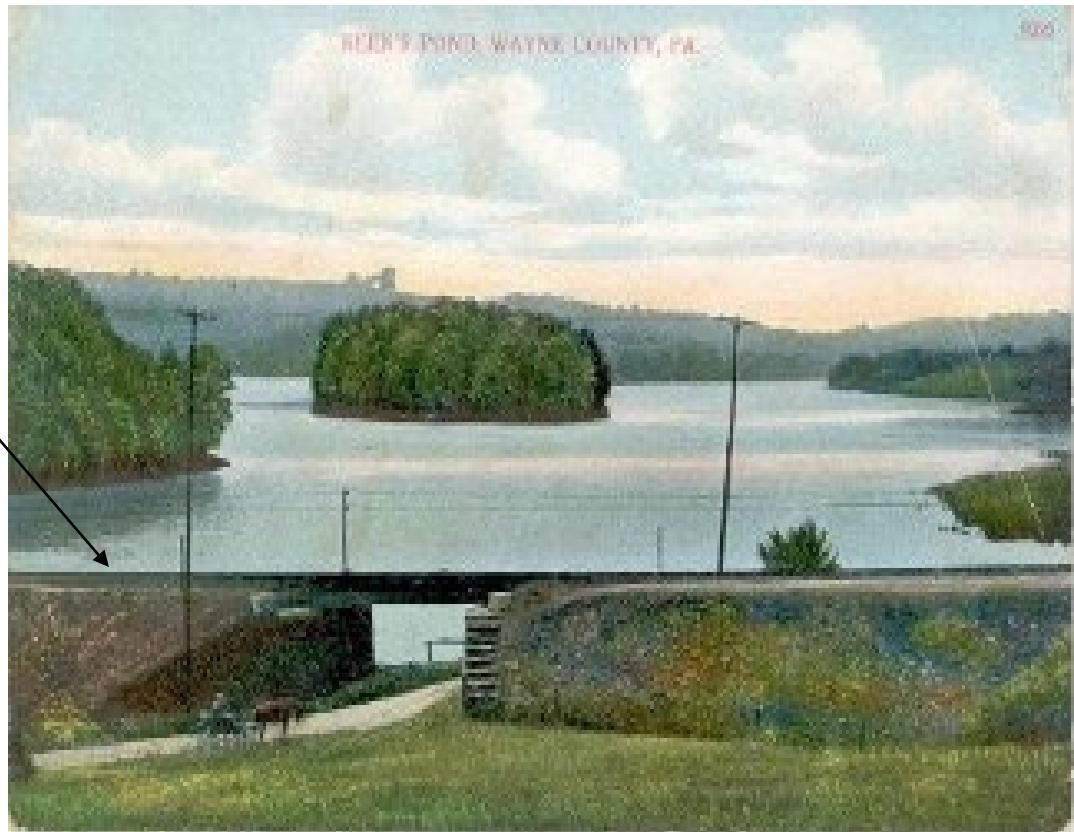
The Six-mile Level just past Keen's Pond, from the 1895 map volume:



"The four mile and the six mile levels had each a branch or side track for a short distance, near the center, so that cars moving in one direction could pass those going in the opposite direction, and at these branches were the boarding-houses for the car runners. One of these boarding houses was near the present residence of Jacob L. Keen, and was kept by Warren Dimock, and the other was opposite the present residence of Henry L. Phillips, and was kept by George M. Keen." (Torrey, 1882; see biographical portrait of Jacob L. Keen in Matthews' *Wayne, Pike and Monroe Counties*, pp. 556-557. Jacob L. Keen was a son of Captain Mathias Keen. Keen's Pond, a feeder pond for the D&H Canal, was originally named Canoe Pond. The island in the center of the pond is called Hermit Island, and at one point there was a dance hall on the island.

More on the Keen family: Captain Mathias Keen, a native of Orange County, NY, came to Wayne County in 1811 and located in Canaan Township and established both a saw and a grist mill on the 200-acre pond (a feeder pond for the D&H Canal, significantly) that now bears his name. One of his grandsons, James B. Keen--born August 13, 1829, a son of Elihu C. and Julia C. (Keen) Keen--served as county commissioner of Wayne County.

Here is a 20th-century post card of "Keen's Pond Wayne County, PA," showing Hermit Island, in the center of the pond, and the tracks of the D&H's Honesdale Branch along Keen's Pond. An electronic copy of this post card view was made available to us by Diane Kurlansky, Washington Street, Carbondale.



“The entire length of the railroad from the mines at Carbondale to the basin in Honesdale was 16 7/8 miles. At the time the road was built it was calculated to afford ample facilities for transporting 100,000 tons of coal per year, that quantity being deemed as great as it was needful to provide for.” (Torrey, 1882)

2908

More on the three Levels from Torrey

“It was originally expected to make use of locomotive power on the three long levels, known as ‘summit level,’ ‘six mile level,’ and ‘four mile level,’ and to use horses on the other levels between the planes. / Three locomotives [emphasis added by the author for reasons that will become clear later in this study] were made for the company in England under directions of Horatio Allen, and brought to New York to be so used, but on the trial of one of them, the track was found too weak to admit of their use with safety; and the use of horses was thus made necessary on those levels also. / On the summit level one horse could not draw more than two loaded cars at a time. / On the six mile level, between Waymart and Prompton, the grade was such that loaded cars descended by gravity, and cars were provided with a sufficient number of horses to ride with each train, to draw the empty cars back—one horse being thus able to return four empty cars. These horses became so accustomed to riding down the grade that when, by reason of ice on the rails, the cars required force to propel them, some of the horses clearly showed an unwillingness to go upon the track and draw the cars in that direction. / On the four mile level, between Prompton and the canal basin, the grade was such that one horse could draw five loaded cars down, and the same number of empty cars back.” (Torrey, 1882)

2909

Roadbed: Honesdale to Carbondale

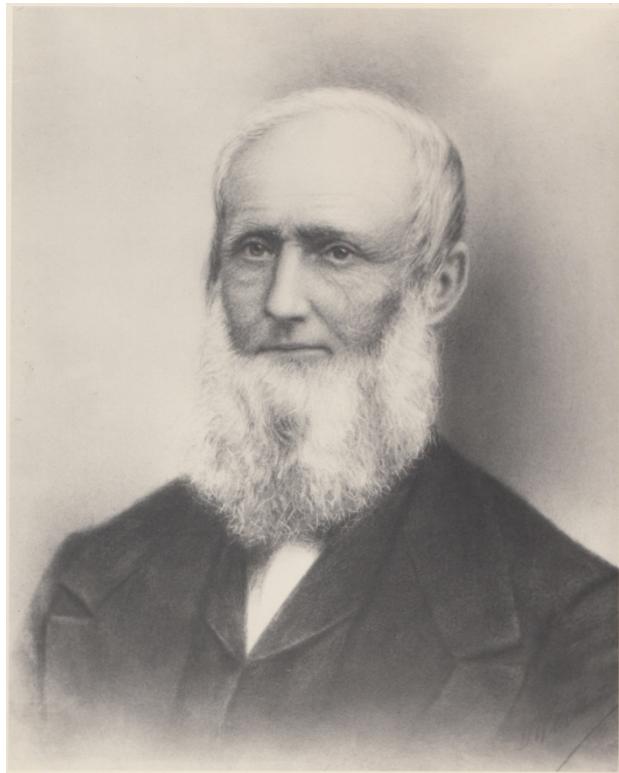
The return of the empty cars: the empty coal cars were pulled, five at a time, from the canal basin back to the foot of Plane No. 8 by horses. The cars were drawn up the plane by the weight of descending loaded cars, the empties serving as a partial counterbalance. From the head of Plane 8, the cars were also pulled, four at a time, by horses back to the foot of Plane 7. The cars were then drawn up Planes 7 and 6 to the top of the Moosic Mountain at Farview by the weight of descending loaded cars. Horses then pulled the empties back across the Summit Level to the head of Plane No. 5, where the cars were let down back through the system to the foot of No. 1. On all the levels between the planes on the Moosic Mountain, horses moved the cars—loaded and light.

2910

John B. Jervis Description of the Gravity Railroad, 1833

John Jervis: worked on the family farm and sawmill in Rome, NY, in 1817, when the construction of the Erie Canal began. He got a job as a tree cutter; he became a rodman in a surveying crew, then a surveyor, then Resident Engineer on a 17-mile section in the middle of the canal. When asked by Wright to come work on the D&H Canal in 1825, Jervis was Superintendent Engineer for an entire division of the Erie Canal.

Here is a photograph of John B. Jervis that is in the archives of the Minisink Valley Historical Society:



On February 26, 1833, John B. Jervis, Civil Engineer, wrote, at Albany, a Letter to the Editor of the *American Railroad Journal and Advocate of Internal Improvements* (letter published on cover page and pp. 162-63 of Volume II, No. 11, Saturday, March 16, 1833; journal published weekly at 35 Wall Street, New York, \$3 per annum; D. K. Minor, Editor). Jervis' description of the "Carbondale Railroad" is remarkable not only because it was written by Jervis, who designed the railroad, but also because it was written only four years after the road opened. This very interesting and valuable description contains technical details that are reported by Jervis and no one else. Here is that Letter to the Editor:

"To the Editor of the *American Railroad Journal*. / CARBONDALE RAILROAD.—Perhaps you may think the following brief description of the Carbondale Railroad will be interesting to the readers of your Journal. If so, it is submitted for publication.

This railroad extends from the head of the Delaware and Hudson Canal at Honesdale, Pa., to the coal mining belonging to the Delaware and Hudson Canal Company at Carbondale. It was hinted at in the report of John S. Sullivan, Esq., on the projected Delaware and Hudson Canal, dated January 7th, 1824. No surveys were made at that time, and nothing definite was done until the

autumn of 1826, when the Directors of the Delaware and Hudson Canal Company instructed Benjamin Wright, Esq., (at that time Chief Engineer of the company,) to report to them a plan for the railroad, with an estimate of expense. Surveys were made to determine the elevation to be overcome, but not sufficient to locate the line. The ascent from Carbondale to the summit was found to be about 850 feet in a fraction over four miles, and the descent from thence to Honesdale about 950 feet, making an elevation of 1,800 feet to be overcome in 16 miles. Mr. Wright submitted a report during the autumn above referred to. This report was general in its character, and did not go into any particulars in relation to machinery to facilitate transportation over the elevation.

On the 4th of April, 1827, the undersigned was instructed by the board of managers of the Delaware and Hudson Canal Company to make a location of the railroad, and to submit a report of such plan as he should recommend, with an estimate of the cost of the same. In consequence of the irregularity of the country, and the dense forest that covered it, the greatest part of the season was occupied in surveys, before a location could be settled. On 22d October, a report, in obedience to the instructions above mentioned, was submitted to the board of managers, embracing a plan and an estimate of the cost of construction. The plan was essentially adopted by the board, and on the 25th November the work was put under contract.

At a time when there was no experience of moment in this country in surmounting great elevations by railroads, it will readily be conceived that, to rise 850 feet in about three miles, (this being the length of road from the mines to the summit,) by a method that would be safe, regular, and economical in its operations, was no easy task. The plan of machinery in general use at the time in England, on which to wind the ropes that drew up the waggons, was the large drums. This was considered in several reports objectionable, and a new plan was designed, which was supposed to obviate the objections alluded to. This plan substituted a horizontal sheeve wheel, on which was worked an endless chain. It permitted the engine to run constantly in the same direction, and the loaded carriage to uniformly occupy the same side of the road, thereby avoiding the necessity of changing the waggons at head and foot of the inclined plane, as is required by the reciprocating plan. The machinery worked in all respects well, except that the chains were not able to bear the service. They frequently parted, particularly after they had worked about one month. It was also found that the chain was very severe on the sheeve wheel and friction rollers. After hauling about 10,000 tons of coal, the interruption and damage occasioned by the breaking of the chain, and the severity with which it wore the other parts of the machinery, induced its abandonment. It now became an important question to determine in what manner the machinery could be most economically altered so as to adapt it to the use of ropes. They were not known at that time to have been used for ascending planes, on any other plan than by winding up on large drums. It was decided, however, to adopt a plan by which the horizontal sheeve could be used, so as to allow the engine and all other machinery to remain as it had been placed for the use of chains. This was done by substituting a double for a single sheeve wheel; and by the aid of an extra sheeve wheel, the rope was made to pass twice round, or fill both grooves in the main sheeve. The object of this arrangement was to obtain more hold, to

prevent the rope from slipping, which proved to be completely successful. The ropes work much more kindly on all parts of the machinery than chains. This plan of machinery was put in operation in the spring of 1830, and with some improvement has been adopted on the inclined planes of the Mohawk and Hudson Railroad. Experience has thus far proved it to be a convenient and economical plan for ascending planes, and it is equally efficient for descending when there is a large preponderating force to regulate. This road has five ascending inclined planes between Carbondale and the summit of the mountain, each worked by a stationary steam engine.

After ascending the mountain, the road is nearly level $1 \frac{1}{2}$ miles, the descent being one in 1500, which was given to favor the motion of the loaded waggons to the head of the first descending plane. The descent of the mountain in the direction of the line of road was very rapid for the first mile and a half, being near 500 feet.—This was divided into two inclined planes, (with a small declivity from the foot of the first to the head of the second,) the first having a descent of 353 feet, and a horizontal line of 4,260 feet; the second has a descent of 127 feet, and a horizontal line of 1,524 feet. The great bulk of the freight contemplated was coal, by which the loaded waggons would descend these planes, and the empty ones ascend. It was an object of great importance to provide some plan of easy management and regulation, to control the great preponderating power of the loaded waggons in descending the planes.

The following extracts from the report of the undersigned, above alluded to, will give an idea of the method adopted:

‘The usual, and I believe the only method that has been adopted to effect this object, is the application of friction by means of the brake. This is convenient when the preponderance is small, but when as great as will be required for our purposes, I consider it very imperfect, and liable to the following objections: In the first place, the application of so much friction as will produce the required resistance will rapidly cut and wear away any material that may be used, and consequently require frequent repairs. In the second place, it will require constant attendance from the time carriages commence their descent until they reach the foot of the plane; and any neglect of the attendant, or accident, that may prevent the proper application of the brake, will be likely to produce disastrous consequences.—Reducing the number of carriages will lessen the difficulty, but, as before observed, will produce delay, and increase the expense of the operation.’

‘In view of the objections to the plan in use, I have invented a pneumatic convoy, which will effectually answer our purpose. To obtain a satisfactory test or the principle, I had an apparatus constructed, by which I made 76 experiments on the resistance of atmospheric air, with sails of different area, and moving at different velocities. The results gave a greater resistance than the experiments made by Rouse or those by Borda: but the experiments were comparatively on very small surfaces, and Borda says, by increasing the area, he found the resistance to increase in a greater ratio; which was also proved by my experiments. The largest sails I used had each an area of 21 square feet, and I consider the different results accounted for on this principle.’

‘With a velocity of 40 feet per second, the resistance on a sail containing an area of 40 square feet, will be 6 lb. per foot. Now, to provide for a resistance equal to the preponderating power, will require 2239 divided by 6 equals 373.16 square feet of sail. I propose to divide this into eight sails, to be attached to two vertical shafts; the motion to be communicated by a spur wheel on the shaft of the engine sheeve, driving a pinion on each of the sail shafts. This is all the machinery required for the convoy.’

‘By this method, when the carriages begin to descend the plane, the machinery being attached to the engine sheeve, will be put in operation, and produce the requisite velocity for the sails to equilibrate the preponderance; and as the adjustment is permanent, no attention will be required but to fasten and unfasten the carriages, and check them on their arrival at the foot of the plane. The machinery will be very simple, and may be constructed with such strength as to leave scarcely any hazard of accident by derangement, and it will hardly be exposed by any from inattention.’

The machinery was put up on the plan described in the preceding extracts, and it is difficult to conceive how the descent of heavy trains of waggons could be better controlled.

From the foot of the second descending (or self-acting engine) plane commences a descending road quirally inclined 1 in 120 for near six miles. The loaded waggons, in trains of from 20 to 30, descend this section by their own gravity, being kept in proper control by the friction brakes attached to them, which are managed by from two to four men, according to the number of waggons in the train. There are several small waggons attached to the train, on which the horses ride down with the loaded waggons to draw up the empty ones. This method of transporting the horses has proved very advantageous in economizing the expense. Experience has shown that the best declivity for a descending trade [grade?], when animal power is used, is that on which the loaded carriages will just descend with proper velocity, by their own gravity. The extra power required to return the empty waggons being more than compensated by the advantage the animal obtains in riding down with the load.

At the termination of the section above mentioned commences the third descending plane, which is supplied with the same kind of machinery as that in the two planes first descending from the summit of the mountain. From this plane the road descends at 1 in 200 a distance of near four miles to the head of the Delaware and Hudson Canal at Honesdale, when it terminates at an elevation of about 16 feet above its level. This elevation admits of a convenient arrangement for side docks, by which the coal is discharged from the waggons on an inclined platform, down which it is moved with great facility into boats that lay alongside.

The construction of the road was for the greatest part through a dense forest, and over a country of great irregularity. It was considered advisable to construct the road in as cheap a manner as practicable, and leave to future experience and more enlarged means the construction of a more substantial and permanent work. In accordance with this view, the ridges that fell in line, and were elevated above the grade of the road, were excavated; but the valleys, instead of being filled

by permanent embankments of earth, were crossed by bridgework of different kinds, according to the height of the work.—Where the height did not exceed three or four feet, posts were set in the ground to support the road; where the elevation was higher, framed tressles [sic] were put up, standing on blocks or pillars of stone.

The waggons used on this road weigh empty about 22 cwt., and carry 2 $\frac{1}{2}$ tons of coal.

In the year 1830, about 42,000 tons of coal were carried over the road; in 1831, about 55,000 tons, and in 1832, about 90,000 tons. The economy of transportation is fully settled; and notwithstanding the great elevation being more than an average of 100 feet per mile, by the aid of machinery and stationary steam engine power, it is effected for 35 cents per ton over the whole length of the road, (16 miles,) being less than 2 $\frac{1}{2}$ cents per ton per mile, including the use of waggons. This, it must be recollect, is transportation entirely in one direction and consequently costs about two fifths more than if the loading could be equal in both directions. It is about the same cost of transportation as would be incurred for the same distance on a level railroad by animal power, showing the superior economy, in situations where it is available, of mechanical over animal power.

On a road subject in its operations to so many changes from moving to stationary power, it was apprehended there would be many accidents and delays, that would seriously embarrass and increase the expense of transportation. Experience has, however, shown this apprehension to have been groundless. The men engaged in conducting the business of the road soon acquire the skill that is necessary and the work is conducted with the greatest regularity and certainty. Heavy trains of carriages, loaded with the mineral productions of the valley, ascending with celerity and certainty the successive planes, until they reach the summit of the mountains, present a scene gratifying and interesting to a high degree.

This work, in connection with the Delaware and Hudson Canal, opens an easy communication between the coal in the valley of the Lackawanna and the Hudson river. The whole work, in view of the circumstances of the country at the time of construction, was a bold and hardy enterprize, and by many intelligent men was considered as entirely chimerical. Its completion and subsequent success has dissipated the apprehensions of its failure, and place it among the most valuable and important improvements of the day. Respectfully, your ob't serv't,

JOHN B. JERVIS, Civil Engineer.
Albany, 26th February, 1833."

2911

The First Deep Underground Anthracite Shaft Mine in America

Archibald F. Law was the first D&H mining engineer. In June, 1831, under his direction the D&H opened the first deep underground anthracite shaft mine in America. The mine was located just west of the D&H Seventh Avenue crossing in Carbondale.

During the calendar year 2011, Donald Law (Phoenix, AZ) donated to the Carbondale Historical Society a collection of nineteenth-century mining artifacts, anthracite mining memorabilia, books, photographs, and Law family memorabilia. In addition, in 2011, Donald Law donated to the Society three oil paintings of Law family members: Archibald F. Law (1799-1848), Charles Law (1833-1910), and Archibald F. Law (1856-1914).

Here is a photograph, by Hank Loftus, of the original oil painting of Archibald F. Law that was donated to the Carbondale Historical Society by Donald Law, Phoenix, AZ:



Archibald F. Law (1799-1848). Collection of the Carbondale Historical Society and Museum, Inc. Gift of Donald Law, Phoenix, AZ, 2011

Here is a photograph of the First Underground Mine Monument on the site where it was erected by the D&H in 1901. This photograph is reproduced here from page 24 of *Geography and History of Northeastern Pennsylvania* by A. F. Stokes, formerly editor-in-chief, International Correspondence Schools, Scranton, Pa., 1936.



Here is another photo of the First Underground Mine Monument, in its original location, just west of the Seventh Avenue D&H Crossing, Carbondale. Photo given to the Carbondale Historical Society by Bob Vandenberg, Washington Street, Carbondale.



First Underground Mine Monument in its original location, just west of the Seventh Avenue D&H Crossing.

The text on the plaque attached to the monument shown above is as follows:

The
D&H
The First
Underground Anthracite
Mine Opened Here
June 1831.
By Archbald Law
First Mining Engineer
Of
The Delaware and Hudson
Canal Company
John Wurtz, Pres.
John P. Williams, Treas.
Officers of
The Delaware and Hudson
Company 1901.
Robt. M. Olyphant, Pres.
F. M. Olyphant, Secty.
C. A. Walker, Treas.
C. C. Rose, Supt. Coal Dept.
Erected 1901
The Fiftieth Anniversary
Of the
City of Carbondale.

In Part 4 of P. S. Joslin's series of articles on the early days of Carbondale that was published in the Carbondale Leader in 1899 (*CARBONDALE IN ITS INFANCY / A Series of Articles on the Early Days of The Anthracite City by One of Its Pioneers*, Part 4, *Carbondale Leader*, August 26, 1899, p. 6), we read the following about Archibald Law: "A. F. LAW / Archibald F. Law came from Scotland in the spring of 1830, his family following in 1831. He first went to Pottsville, but finding no underground mining, he came to Carbondale. As it was dense wilderness between

Pottsville and Wilkes-Barre, he reached Carbondale by way of Philadelphia, New York, Rondout and the D&H Canal. He was first employed as coal inspector, but soon after assumed the charge of the original underground mine with cars and track, probably the first in use in the state. He was mine superintendent for the Delaware & Hudson canal Co. from 1832 to February, 1843, when he was so severely injured by a fall of coal that his lower limbs were totally paralyzed. / He was elected justice of the peace in 1846 and served until his death in June, 1848 at the age of 48 years. / He expressed the opinion as early as 1836, that Wilkes-Barre would be the great centre of the anthracite coal trade, for the greatest deposit was at that end of the coal basin. He also thought that the best way to take the coal to market from the upper Lackawanna valley would be to tunnel the mountain at some place above the Morss tannery to the head of the Lackawaxen, and then have a down grade to tide water. This idea is now occupying the thought of both the D. & H. company and the Erie company. / Mr. Law was survived by his wife and five children. John S. in connection with John Howell, opened the largest dry goods store up to that time in the city. It was burned, and they did not rebuild, as the villages of Archbald and Olyphant were springing up, which diverted the trade that had been before coming into town from that direction. The same firm afterward went to Pittston, where they did business for many years. From Pittston Mr. Law went to Wilkes-Barre, to take charge of the works of the Dickson Manufacturing company located there. From there he moved to New York where he died. / Charles, the second son is living in Pittston, where he has lived for many years and for several years past has been sales agent for the Hendrick Manufacturing company. / Of his daughters, Ann married Andrew Bryden of Pittston. She died in 1855. Marian married Tempest Howarth, Margaret the youngest married John Cosgrove, who was killed in the mines at Pittston. She still lives in Pittston."

Notes on Archibald Law from Jerry Palko:

"Archibald Law, son of Charles and Ann Falconer Law, was born in Wanlockhead, Scotland, in 1799, and was reared in mining engineering. In 1830 when 39 years old and after having served as chief engineer for Scotland's fifth Duke of Buccleugh of Scotland and a native of Scotland, Law came to the United States and located near Pottsville. Shortly thereafter, he moved to Carbondale and took a job as mining engineer with the Delaware & Hudson Canal Company. His extensive knowledge contributed in a principal degree to the development of the properties and extension of the business of the D. & H. Of notable importance was the introduction by him just a year after he arrived in Carbondale of a method of underground mining in place of that then in vogue. The old method was working coal from the surface by stripping or quarrying. Law's momentous innovation, underground shaft mining, was commemorated by a massive monument erected at the site of the first underground anthracite coal mine in the western hemisphere. The monument, erected on the occasion of the 50th anniversary of the founding [It was the 50th anniversary of its *incorporation* as a city.] of Carbondale. Before coming to America, Law had made a close study of the properties of anthracite and methods of mining it and he became a recognized expert on the subject. Based on his expert knowledge, the D& H first made him an inspector to determine the quality and combustion of coal, and also chief mining engineer. / Unfortunately, Law's life was prematurely shortened. In 1836, he was severely injured from a falling mine roof. And in 1843 he was permanently disabled in another accident which hastened

his death. He was making a dangerous inspection of mine pumps when a mass of slate roof fell on him, injuring his spine. / . . . Law was considered a man of noble character, liberally educated, a diligent student of general literature as well as that relating to his profession, and was possessed by a degree of literal ability which would have furnished him with credible occupation in whatever field he might have entered. / His wife, who he married in Scotland, was Mary Shennan, daughter of John Shennan, who came with his family to Greenfield Township, where he passed his life as farmer until he moved to Scranton shortly before his death. Mary Shennan Law died in 1876 at age 79. / The children of Archibald and Mary Shennan Law included: / John S., who was for several years the manager of the Dickson Manufacturing Company, later president of Miners' Bank in Wilkes-Barre, and, at the time of his death in 1892, president of the Lackawanna Coal Company. / A Mrs. McMillan, about which little is known. / Margaret, later Mrs. Cosgrove of Pittston. / Charles (second oldest), who was born in Carbondale in 1833, where he attended public schools and at 13, he became an indentured apprentice in the mercantile business of Law & Howell, the senior partner being his elder brother. He was later involved in business in Pittston. Upon his retirement, he contracted connections with many businesses, including Hendrick Manufacturing Company of Carbondale. On November 25, 1854, he married Ellen Atwater, whose family were among the first settlers of Providence Plantation, and a member of which served as chief of Gen. George Washington's medical staff. They had 10 children, including Archibald F. Law, who became a prominent Scrantonian; William, Babylon Coal Company paymaster who lost his life in a Duryea store fire in 1897; John, secretary of Title Guarantee and Trust Insurance Company, Scranton; Mrs. Thomas H. Watkins, whose husband was of the firm Simpson & Watkins, well known coal operators [Egerton?]; Mrs. George Cross, whose husband was president of Cross Engineering Company of Carbondale; Mrs. Herman Warner, wife of a Deborah, Iowa merchant; Charles, engaged in the coal business in Pittston; Robert M., treasurer of Pennsylvania Coal & Coke Company, Philadelphia; Ann M., who resided with her parents; and James C., treasurer of Illinois Telephone & Telegraph Company, a Chicago corporation which controlled subways of that city." Jerry Palko notes

The text on the Mine Monument (erected in 1901) says that Archbald Law opened the mine in June 1831. *Hollister* (unpublished typescript, 1880), says that Professor Silliman of Yale College visited Carbondale in 1830 and visited "the great mine opened by Archbald Law opposite the 'spring or well.' Is that the mine referenced on the monument (which was opened in June 1831)? Here is what *Hollister* reports:

"In 1830, Prof. Benjamin Silliman, of Yale College visited the Lackawanna coal fields. In a pamphlet printed at New Haven, Conn., the same year he thus speaks of the pioneer coal works of Carbondale. / 'The great works of Carbondale, at the head of the Valley are wrought like these at Mauch Chunk, as an open quarry. There is, of course, the greatest facility in coming at the coal, and the water subsides into lower situations. They are now beginning to mine into the hill between roof and pavement.' / Of the great mine opened by Archbald Law opposite the 'spring or well' he thus describes:

[The next two paragraphs are part of Professor Silliman's report about "the great mine opened by Archbald Law opposite the 'spring or well'.]

'Carbondale bed, owned by the Delaware and Hudson Canal and Railroad Company.'

1. Soil.
2. Dark Earth, 3 ft.
3. Loose slate, 5 ft.
4. Broken Coal, called here 2d quality, not considered fit for market, 2 ft.
5. Good Coal, called first quality, 6 ft.
6. Coal of still greater quality 1 ft.
7. Coal, 1st and 2nd quality intermingled 3 ft.
8. Coal very good quality, 4 ft.
9. Good coal with strata of slate intermixed, 6 ft. (Twenty ft. wrought for market)
19. Firm slate with vegetable impressions and pyrites; thickness not known.

The mining has been so far in the open air, but they are now beginning to follow the bed without removing the superincumbent materials; pillars of coal being left to support their weight. About three and one-half acres of the bed have been removed; the mining, (including also the removal of the rubbish above and intermixed) costs the Company about 75 c [cents] per ton. They now offer their coal at Kingston, on the Hudson, at \$6.00 per ton; the cost of transportation thence to New York, is 50 c [cents] per ton. The quantity sent off to market averages 250 tons per day, during eight or nine months. ' "

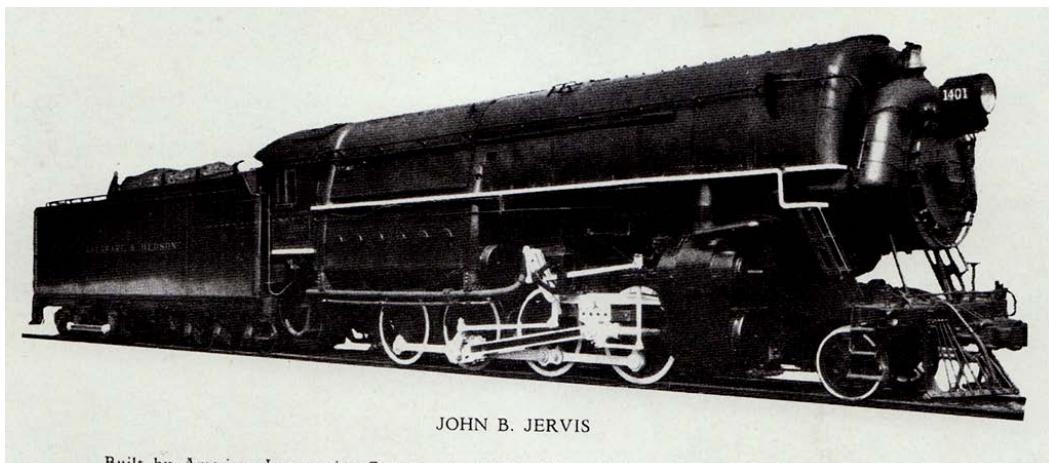
Hollister continues (pp. 42-43) as follows: "COMMUNICATIONS – CARBONDALE. / Again, Prof. Silliman, says: 'When the communication by the Canals and railway of the Hudson and Delaware company shall be fully adapted to the convenience of travellers, they will begin to pass from the Hudson to the Delaware, and then to the head of the Lackawanna valley. The canals and railway and steam engines, for conveying the coal, will form a very gratifying subject of observation, and the sight of the great mine at Carbondale and suburb of New Dublin, containing the laborers employed about the mine, have arisen within a short period. / The mine is situated in the front of the hill; it is quarried in a continued line, for sixty-rods, and presents a front of good coal of twenty feet in thickness, besides several feet more of roof coal, stained and shattered by time and the weather. Great as have been the expenditures [sic] of the Company, if any mining object can justify them, it must be such a deposit of coal. This mine and other mines in the vicinity—as for instance the rich bed of Thomas Meredith, Esq., and the various other beds already opened in the Lackawanna valley, leave me room to doubt that the coal is inexhaustible. Several stationary steam engines draw up the coal in waggons, on a railway from the mine, to the summit level, whence it descends to the canal. The entire railway is sixteen miles long, and the canal along the Lackawaxen thirty more. From this Canal it crosses the Delaware and proceeds by another canal to the Hudson, sixty-seven miles to the vicinity of Kingston. / The establishment at Carbondale, is only the opening of the great valley of the Lackawanna, and of

Wyoming. The Hudson and Delaware Company, will now convey coal from the other mines, for a rate which may not be improbably be hereafter reduced; so that much of the coal of the valley may find its outlet in this way and other communications to the Delaware, the Hudson and to the northern part of New York are in contemplation."

2913

D&H Locomotive John B. Jervis

In 1927, the D&H built a locomotive that was named John B. Jervis, in honor of the distinguished civil engineer who designed the 1829 Gravity Railroad. Here is a photo and description of the John B. Jervis from *Railroadians* . . ., p. 93:



JOHN B. JERVIS

Built by American Locomotive Company in 1927. Type 2-8-0. Gauge of Track 4'8½". Cylinders, Diameter High Pressure 22½", Low Pressure 38½", Stroke 30". Driving Wheel Diameter 57". Boiler, Water Tube Type, Diameter 61½", Pressure 400 Pounds. Fire Box, Length 152", Width 77½", Tubes, Superheater 52, Diameter 5½", Length 15'0", Regular 101, Diameter 2", Length 15'0". Wheel Base, Driving 18'0", Engine 29'0", Engine and Tender 74'11½". Weight in Working Order: Leading Truck 41500 Pounds, Driving 295000 Pounds, Engine 336500 Pounds, Engine and Tender 553400 Pounds. Fuel, Bituminous. Heating Surface: Tubes 788, Flues 1116, Fire Box 1150, Arch Tubes 67, Total 3121 Square Feet, Superheater 700 Square Feet. Tractive Power: Simple at 400 Pounds Boiler Pressure 85800 Pounds, Compound at 400 Pounds Boiler Pressure 71600 Pounds. Tender Booster at 400 Pounds Boiler Pressure 16200 Pounds. Tender Capacity, Water 12000 Gallons, Fuel 16 Tons.

2913

The Original Rails

"The rails on the Gravity Railroad when the road opened in 1829 were 6 x 12 stringers of hemlock set on edge to form the rails. These stringers, which were twenty to thirty feet in length, were notched into heavy cross ties to which they were secured by wooden pegs. The cross-ties were placed ten to fifteen feet apart and were in turn supported by wood or stone piers. The whole structure was thus held clear of the ground to prevent rotting. The running edge of the rails was protected from wear by a strip of strap iron one-half inch thick by two and one-half inches wide and was secured to the rails by countersunk screws." *E. D. LeRoy*, pp. 23-24

The initial rails were later improved by the placement of a 2" x 4" oak (some sources say beech) strip to the running edge on top of the original hemlock rails—which were found to be too soft. The strap iron was then placed on top of the oak/beech band.

In 1893, C. V. R. Ludington spoke about early D&H history (article in Gritman scrapbook), including Allen's ordering of strap rail and three locomotives in England. Here is the section of that article on the present question: ". . . Horatio Allen, a famous civil engineer, after completing his surveys and work for the Delaware & Hudson Canal company on the line over which the first locomotive was to pass, resigned his position and made a visit to England and Wales in 1827 for the purpose of examining the much-talked-of system of using steam as a motive power in hauling coal from the mines. He had heard of the success of George Stephenson with locomotives. While on this visit he had some correspondence with John B. Jervis, the chief engineer of the Delaware & Hudson Canal company, who learning of his purpose commissioned him to purchase the iron in England for the railroad between Honesdale and Carbondale, and the chains to be used for their inclined planes, and also to purchase three locomotives* [emphasis added] to be run on their rails. / Mr. Allen devised the plan or form of the rail. The ironmasters, except one or two, pronounced them impracticable. He finally ordered them made at Merthyr Tydvil in South Wales, but they were so badly made that he refused to take them. He then went to Wolverhampton, England, and contracted for their manufacture. Here for the first his plan was approved. The rails were manufactured, shipped, laid and formed the first railroad track of the company intended only for steam power." (*"THE FIRST LOCOMOTIVE. / Discussion of What It Was and Where It Ran / C. V. R. Ludington Describes the 'Stourbridge Lion' and Its First Trip at Honesdale. / . . . article dated Friday, April 21, 1893 in Gritman scrapbook*)

**Mathews*, p. 239: "While Mr. Allen was in England, the Liverpool and Manchester Railway was in process of construction, and whether it should be operated by locomotives or stationary engines was a question still hotly debated. The most eminent engineers pronounced against the locomotive, and a committee appointed to consider the subject reported in favor of stationary engines. It was resolved, however, to make a practical test, and a reward was offered for a steam carriage that should meet the requirements of the road. Pending this controversy, Mr. Allen decided on locomotives for the Delaware and Hudson road, and three were built under his direction, [emphasis added] with some improvements on existing engines, among which was the removal of the fire box from the boiler, and its location underneath."

2914

More on Rails

"It is also interesting to know that the rails themselves have become heavier as railroad development progressed. On the gravity road they averaged 44 pounds per yard; on the main line in the past century, 67 pounds. Delaware and Hudson tracks today [1929] on the Pennsylvania Division vary between 90, 100, and 110 on the Jefferson sub-division." (Biographical portrait of James D. Hevers, pp. 99-100, 108, of the April 1, 1929 issue of *The Delaware and Hudson Company Bulletin*)

On the rail sizes, by today's standards 100 and 110 lb rail is about the minimum for any application in secondary use, main line is 144 now.

2915

Gravity Gauge and Standard Gauge

Gravity Gauge: (4 feet 3 inches):

“The Battle of the Gauges” (notes and quotations from the article in the December 1, 1934 issue, pages 181-183, 188, of *The Delaware and Hudson Railroad Bulletin*): In America in 1837 there were at least seven different track gauges on American railroads, many of those gauges fixed by laws of the various states. The distance between New York and Washington, for example, was initially spanned by a series of non-connected rail lines, whose trains ran independently of each other. Passengers frequently had to change cars many times in the course of a journey because of non-connected rail lines and different gauges. From a study of *Ashcroft's Railway Directory* for 1867, it has been determined that as late as 1866 there were no less than 12 different railway gauges in use in the United States. “The steam road built by the Delaware and Hudson to connect its more distant mines with the terminus of the Gravity at Carbondale, was built to standard, 4 feet 8 $\frac{1}{2}$ -inch gauge, three rails being used so that trains made up of equipment from both roads could be hauled in the same train. With the leasing of the Albany and Susquehanna [“The formal opening of the Albany and Susquehanna Railroad, from Albany to Binghamton, took place on Tuesday . . . The Railroad is 140 miles in length and opens up a rich and beautiful agricultural region. / . . . The grade of the road is very favorable for the transportation of heavy freight in either direction. The heaviest grade in going toward the Hudson is said to be fifty feet per mile. *Carbondale Advance*, January 16, 1869, p. 3)], which was 6-foot gauge to facilitate interchange of equipment with the Erie at Binghamton, a further complication resulted. (p. 182)” Virtually all southern railroads had 5-foot gauge; by state law, California railroads also had 5-foot gauge. Gauges on some northeastern Pennsylvania railroads: Albany & Susquehanna, DL&W, Erie—all 6 foot; Lackawanna & Bloomsburg, 4 foot 8 $\frac{1}{2}$ and 6 foot. When the U. S. government decided to build a railroad to the Pacific, a congressional act was passed, in 1862, which authorized the President of the United States to fix the gauge of the Pacific road. President Lincoln chose 5 feet. The President's ruling was not accepted. The quarrel was transferred to Congress, which, in March 1863, passed a law naming 4 feet 8 $\frac{1}{2}$ inches as the gauge of the Pacific Railroad. The declared government standard soon became virtually universal in the United States.

Standard Gauge: (4 feet 8 1/2 inches):

“The ‘Why’ of Standard Gauge / Roman Soldiers, Who Never Heard of Railroads, Set Present Track Span / Have you ever wondered why the standard gauge of railways should be 4 feet 8 $\frac{1}{2}$ inches? It is a curious figure; it does not fit in exactly with yards or feet or inches; nor has it anything to do with the metric system. Yet 4 feet, 8 $\frac{1}{2}$ inches is the gauge of most of the world's important systems, according to a writer in the Philadelphia *Evening Bulletin*. / The question of the railway gauge has formed a puzzle for nearly a hundred years. When Stephenson

was asked by the Railway Gauge Commissioners why he had adopted 4 feet 8 ½ inches for his first railways, he replied that that was the gauge of most of the tram railways in the Newcastle Colliery district. But neither he nor anybody else knew why or when the old tram railways had adopted it. / Recently the true explanation has been found, and it shows that the standard gauge goes back for at least 1,800 years in England, whilst in other countries its history can be traced hundreds of years further back. / Before the coming of the steam engine, colliery wagons were hauled by horses over rails made sometimes of wood, sometimes of stone, and occasionally of metal. It was clearly an advantage for Stephenson to make his steam railways of the same gauge. The first built were for colliery work, and the old vehicles could still be used. But why was this gauge of 4 feet, 8 ½ inches the traditional gauge for trucks used in connection with mines found all over the north of England? / The explanation came to light during excavations of parts of the Great Wall built 1,800 years ago by the Emperor Hadrian from the Tyne to the Solway Firth. Chariot tracks were found in many places, and when these were measured it was discovered that the distance from wheel to wheel was 4 feet, 8 ½ inches. And then the true explanation came to light. / The Roman army's unit of distance was the 'pace,' or double stride—left-right-left. The Roman mile was a thousand paces. We know its exact length, since many of their milestones remain; from this it was found that the pace is 4 feet, 8 ½ inches. / All Roman chariots and all military vehicles were made with a standard track of one pace, or 4 feet, 8 ½ inches to facilitate the building of roads and causeways. The Romans, we know, worked lead and iron mines in the north of England, and some of their mines were still being worked in Newcastle district in Stephenson's time. For haulage they used military wagons, and to make the passage of these easy over soft ground, they laid down tracks made with slabs of stone measuring 4 feet, 8 ½ inches from center to center. Similar tracks of the same width were found in Pompeii and Herculaneum. / Perhaps the most curious part of the whole story is the influence exercised by the Roman soldier's pace on the subsequent history of our railways. It almost seems as though the ghosts of those who first built the great roads of this country determined that the old gauge should be maintained. / 'Many attempts have been made to depart from the standard gauge, but none has succeeded, although a wider gauge would clearly make for more comfortable travel and greater speeds. The Great Western Railway adopted a gauge of 7 feet over all the important parts of its system, and it was in use for many years. But not a yard remains. It may, in fact, be said that the Roman soldier stepped out the railways of the world,' concludes the article. . . " *(The Delaware and Hudson Railroad Bulletin, May 1, 1933, p. 77)*.

Congress named 4 feet 8 ½ inches as the gauge for the Pacific Railroad:

"In March 1863 [Congress] passed a law naming 4 feet 8 ½ inches as the gauge for the Pacific Railroad. / It is very likely that this action, more than any other event in railroad history, was the determining factor in establishing the prevailing standard railroad gauge. All the roads in the country not built in accordance with the decision saw the necessity of track alteration if they were to participate directly in transcontinental traffic and enjoy its benefits. The necessary physical transformation began almost at once, and continued until the declared governmental standard became universal." *(Track and Roadway, published by The Delaware and Hudson Railroad, n. d., p. 86)*

In *Track and Roadway*, p. 87, the D&H uses a photo of a portion of the "Steam Road, Scranton to Carbondale / Ordinary Built (Double Track) 1871 / Track Here Shows 4 Rails to Take Care of 3 Gauges. / 4'3"—Gravity Connection / 4' 8 ½" / 6' 0"—Erie Connections" to illustrate the installation of three different gauges in the same section of rail:



Possible location of this site: see volume on the 1859 configuration, p. 313.

From Jane Varcoe, January 14, 2011:

"Four Feet Eight and One Half Inches

Why was that gauge used in the US? Because that's the way they built them in England, and English expatriates designed the US railroads.

Why did the English build them like that? Because the first rail lines were built by the same people who built the pre-railroad tramways, and that's the gauge they used.

Why did 'they' use that gauge then? Because the people who built the tramways used the same jigs and tools that they had used for building wagons, which used that wheel spacing.

Why did the wagons have that particular odd wheel spacing? Well, if they tried to use any other spacing, the wagon wheels would break on some of the old, long distance roads in England, because that's the spacing of the wheel ruts.

And the ruts in the roads? Roman war chariots formed the initial ruts, which everyone else had to match for fear of destroying their wagon wheels.

So who built those old rutted roads? Imperial Rome built the first long distance roads in Europe (including England) for their legions. Those roads have been used ever since.

Since the chariots were made for Imperial Rome, they were all alike in the matter of wheel spacing. The Imperial Roman army chariots, in addition, were just wide enough to accommodate the rear ends of two war horses.

Therefore, the United States standard railroad gauge of 4 feet, 8.5 inches is derived from the original specifications for an Imperial Roman war chariot."

An article, titled "Automatic Gauging Car," was published in the July 1, 1936 issue of *The Delaware and Hudson Railroad Bulletin*, pp. 101-102. Therein (p. 101), on the question of maintaining a uniform gauge for rail line, we read:

"Within limits, a slight variation from this width [4 feet 8 1/2 inches] is not seriously objectionable, provided it is uniform and constant over long distances of track. Ordinarily it is not necessary to re-gage track if it has increased not more than 1/2 inch and is uniform. Where the gauge is not uniform the wheels of locomotives and cars are thrown sideways with every change in gage and eventually such a piece of track would be hammered out of alignment and surface as well. On Delaware and Hudson tangent or straight track and curves of not more than 8 degrees the rails must be set to the standard gage. The gage is widened 1/8 inch for each two degrees of curvature above 8 degrees, although no track may exceed a gage of 4 feet 9 1/2 inches, or one inch wider than standard."

2916

Chains and then Ropes on the Planes

When the Gravity Railroad opened in 1829, the cars were attached to chains and pulled up the planes by stationary steam engines.

"A stationary steam-engine was used for a motive power at each of the five long planes on the western side of the mountain, which by means of a long chain extending the entire length of the plane, drew up three or four loaded cars, and at the same time let down a like number of empty cars." (Torrey, 1882)

The Chains were made in Liverpool:

The chains (made in Liverpool and purchased by Horatio Allen) were an absolute failure and were discarded in favor of ropes after having been in use only a few months during 1829. (The canal and railroad were both shut down in December 1829, at which time the use of chains was discontinued. When the road opened in April 1830, manila ropes were in place on the planes.)

Concerning the chains, *E. D. LeRoy* (p. 24) quotes Dr. Benjamin Sillman, who wrote to a Mr. Hazard of Philadelphia, during July, 1830: "Last year there was much inconvenience from chains by which the steam engines draw up the coal wagons from the mines; during the season about

fifty coal wagons were dashed to pieces in that manner, and when chains parted the coal wagon could not be seen in its descent; so instantaneously did it dart to its goal, that only a dim streak could be traced through the air. They now use cables of hemp and the accidents do not any longer occur."

Torrey on the use of chains on the Planes:

"A very few years experience [In reality, it was only a few months.] with the use of chains for conveying the loaded cars upon the planes convinced the managers of the road that some material, less liable to break than the chains then in use, must be substituted for them. / Each train of loaded cars passing over the road was liable to be wrecked by the failure of any one of some one hundred and fifty thousand links composing the chains upon the several planes, and many such accidents occurred. / To remedy this, heavy hemp ropes, the strands of which had been saturated with tar, were introduced, instead of the chains, and thereafter such accidents were very infrequent." (Torrey, 1882)

Blacksmith on each plane to mend the chains:

"The planes were at first supplied with chains to pull the loaded cars to the head. These were so liable to break, that a blacksmith was located on each plane to mend them. These breakages became so onerous that soon ropes were substituted." (Joslin/Davies)

By December 1829 there were many wrecks on the planes caused by broken chains, which were the result of manufacturing weaknesses in the chains, and anticipated production/shipment quotas (180 tons per day) could not be met (only 125 tons per day could be shipped because of the broken chain problem). The D&H directors agreed with Maurice Wurts that the chains had to be replaced with hemp ropes. *Lowenthal*, p. 90: ". . . on January 6, 1830, the board resolved to use rope in place of chains on all but ascending Plane No. 1. In the following month [on February 6], after receiving a letter from ironworkers Blackwell & McFarlane [iron makers in Dover, NJ] that they were 'unwilling to undertake the making of chain for Plane No. 1 and guaranteeing to pay damages which might result from breaking,' the managers decided to use rope on that plane as well." The ropes worked well: in 1830, the D&H shipped 43,600 tons of coal over the railroad.

Use of ropes authorized on December 19, 1829:

The substitution of ropes for chains on the Gravity Railroad planes was ordered by the D&H on December 19, 1829, less than three months after the opening of the railroad on October 9, 1829. This we know from an article titled "In 1829 A Series of Important Dates In Connection With the Early Development of The Delaware and Hudson Company" that was published in April 15, 1929 issue, p. 123, of *The Delaware and Hudson Company Bulletin*.

Ropes in place February 6, 1830:

February 6, 1830: Ropes substituted for chains on all ascending Gravity Railroad planes. (*The Delaware and Hudson Company Bulletin*, March 1, 1930, "One Hundred Years Ago," p. 74)

Ropes working well:

"The water was let into the canal on Monday last. Boats are expected to leave Honesdale for New York this day; the cars upon the Rail Road have been in successful operation for several days past; The ropes substituted for chains are said to meet fully the expectations of the company, and will unquestionably secure them against a further loss of Cars. It is worthy of remark that no serious injuries have been sustained during the spring freshet, either by the Company or Raftsmen on the Rivers. (*"Hudson and Delaware, Canal, and Rail Road,"* *Dundaff Republican, and Canal & Rail Road Intelligencer*, April 28, 1830, p. 2)

Dimensions and care of the ropes:

These ropes measured seven and one-half inches in circumference. To protect this investment the ropes, although they were bound with cords and heavily tarred, were carefully taken in each Saturday night and not brought out again until Monday morning, for the 'Gravity', like the canal, did not operate on Sunday.

"In the earliest days of the road, long chains were used to haul the cars, but, being awkward to handle and costly to repair, they were soon replaced by manila ropes seven inches in circumference, overlaid with other ropes three-eighths of an inch in diameter and covered with coal tar. They were so treated to protect them against wear and weather, and yet they were taken indoors every Saturday night and brought out again on Monday morning." *Cassier*, p. 88

Weather note: The D&H Canal and the Gravity Railroad were both shut down in December 1829: The D&H began operations, it must be remembered, during the so-called Little Ice Age, which began in about 1300 and ended about 1850. During that period in North America and in Europe, winters were very often colder and stormier than they are at present.

Ropes slipping; connect idler drum to driven drum by rope belt to prevent slippage:

The ropes, while they greatly lessened the danger of runaway cars brought a new difficulty in that they were frequently slipping on the drums, particularly when they were wet and not until the expedient of connecting the idler drum to the driven drum, by means of rope belt, was struck upon, did they overcome to a great extent this difficulty although that danger remained until years later when the huge ropes were replaced by the first steel cables made by John Roebling.

2917

Ropes and Rope Riggers

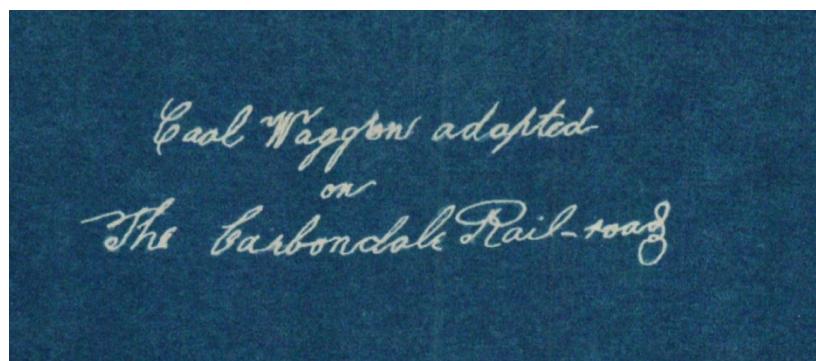
"Hans Johnson, the father of William Johnson, was the first rope rigger. The ropes came here untarred. A walk was run from the bridge over Racket brook to near where the Mitchell hose house now [1902] stands, over which the rope was stretched and tarred. After Mr. Johnson's death Robert McFarlane was appointed. It was said Mr. McFarlane was not a practical rope rigger, but was ably aided by Patrick Garvey who was Mr. McFarlane's foreman. He did not retain the position long, and was succeeded by Evander McLeod, who shortly afterward gave place to Hugh W. Powderly in 1864, and who held the position until the road was cleaned up in 1900, thirty-six years." (*Joslin/Davies*)

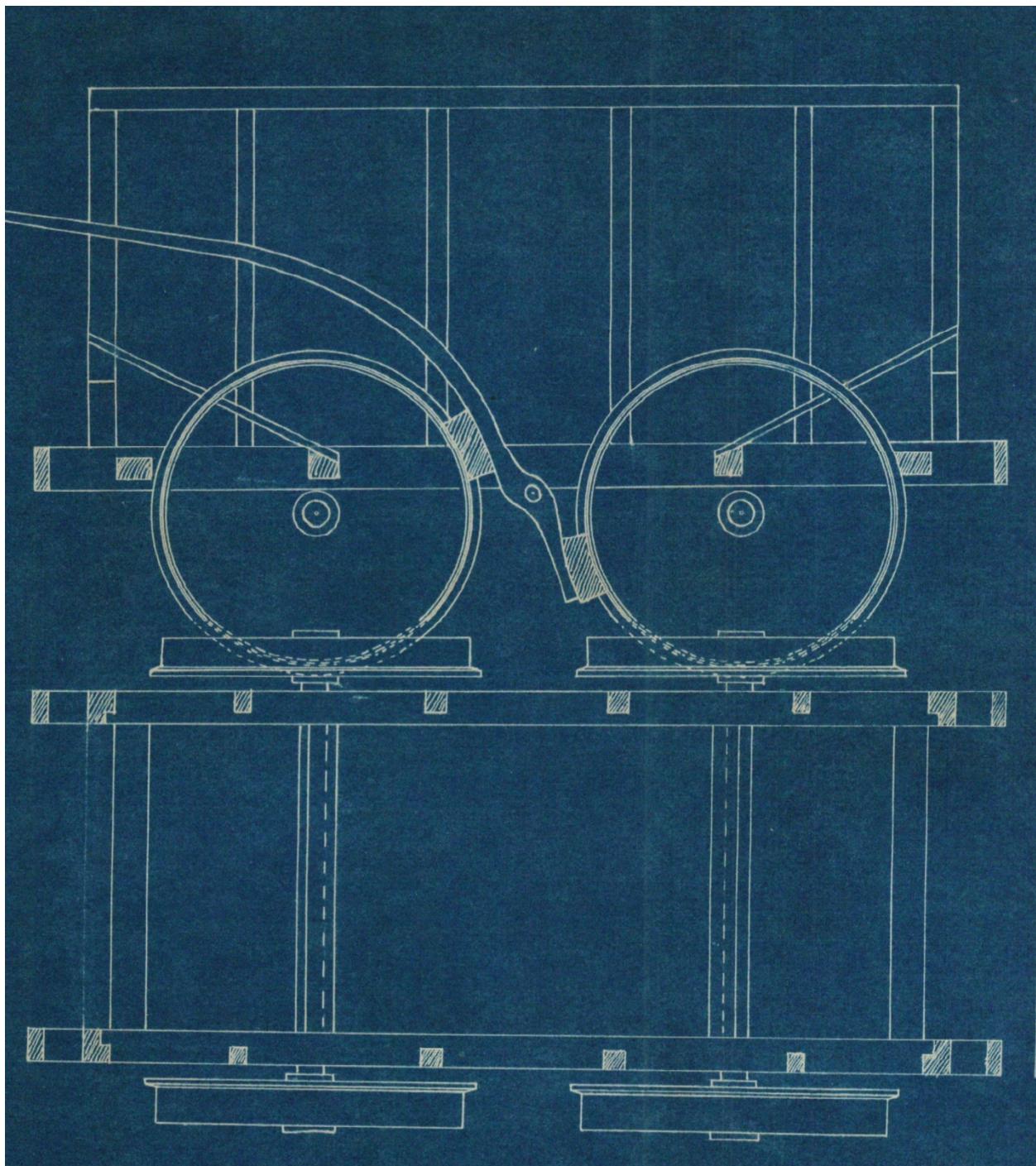
The Original "Waggons" on the Gravity Railroad

Dr. Edward Steers describes (pp. 168-69) the cars used on the line in the early years as follows: "John H. McAlpine was employed, by John B. Jervis, as the superintendent of machinery. According to Jervis, Mr. McAlpine was an accomplished machinist who superintended the construction and maintenance of the machinery in a very satisfactory manner. Mr. McAlpine had a son, William Jarvis McAlpine, who at the age of sixteen became an apprentice, in his father's machine shop. William made, in 1830-31, drawings of both, the wagon used for hauling horses or mules on the descending levels, and the original 'waggon' used for hauling coal from the coal mines to the canal basin in Honesdale. / Mr. McAlpine became one of America's distinguished engineers. He was chief engineer on the Brooklyn Drydock, the New York and Erie Railroad, the Eads Bridge in St. Louis, and other major engineering projects. He served as State Engineer of New York and was president of the American Society of Civil Engineers in 1869. / The original 'waggon' hauled two and one half tons of anthracite coal per 'waggon.'" The coal car which replaced the original type had two four wheel trucks and carried five tons [cars were 12 feet eight inches by 4 feet 2 inches, with 26 inch wheels]. This car [the one that took the place of the original wagons] was designed by Thomas Orchard, master car builder (MCB) of the Delaware and Hudson Canal Company railroad at the car shops in Carbondale." ("The Delaware & Hudson Canal Company's Gravity Railroad," *Proceedings of the Canal History and Technology Symposium*, Volume II, March 26, 1983).

Note: William J. "McAlpine" signed his family name "McAlpin" (see scan here of drawing for horse cars on the six-mile level).

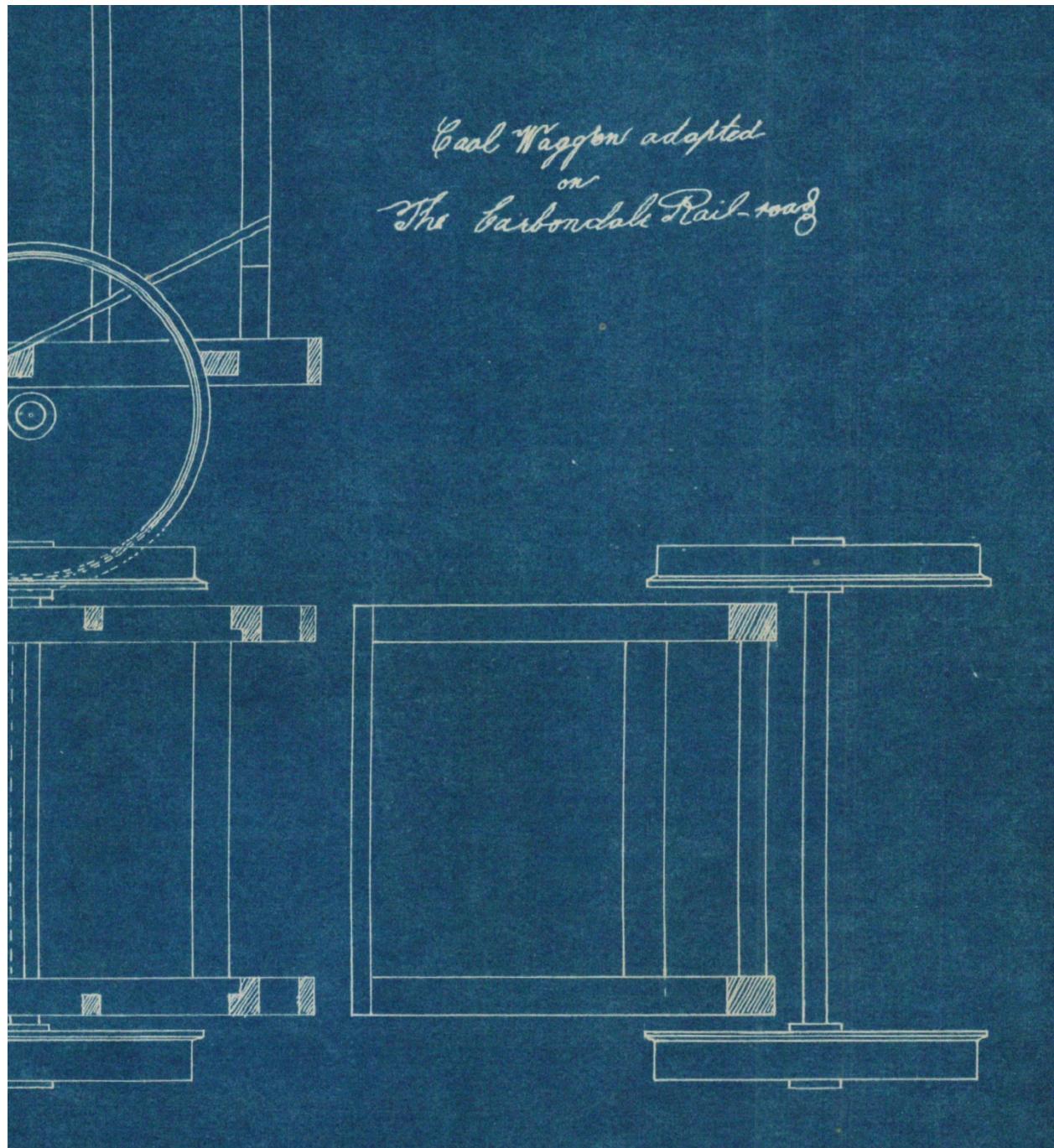
Given below are the drawings (reproduced by E. D. LeRoy) that were created by William J. McAlpin in 1830 for the original "coal waggons" on the Gravity Railroad. These McAlpin drawings from 1830 were transferred to blueprint #267 by E. D. LeRoy. This is one of eleven E. D. LeRoy blueprints in the archives of the Pike County Historical Society at Milford, PA.





Initially, there were 275 coal wagons, each with a capacity of $2 \frac{1}{2}$ tons on the Gravity Railroad. When the road closed in 1899, there were 4,600 coal cars (8 wheels, link and pin couplers), each with a capacity of 5 tons.

Coal Wagons adapted
on
The Barbondale Rail-road



Who Made the Original Stationary Engines for the Gravity Railroad?

In the article given herein on page 87, published in 1829, we read that the engines were made by Messrs. Abeel & Dunscomb of Albany. Dr. Edward Steers says (p. 170) that they were made by the Fishkill Landing Machine Works. He states (p. 170): "The original stationary steam engines were manufactured by the Fishkill Landing Machine Works, located at Fishkill Landing, New York on the Hudson River and next to Mattawan. [We are inclined to believe the 1829 newspaper article as naming correctly the makers of the original steam engines for the D&H.] In 1813, these adjacent towns on the Hudson merged and became present day Beacon, New York. / Phillip Hone and John Jacob Astor were original managers of this company. There were five original engines and they were as follows in horse power: Plane No. 1, 30 hp.; Plane No. 2, 35 hp.; Plane No. 3, 35 hp.; Plane No. 4, 25 hp.; Plane No. 5, 35 hp." ("The Delaware & Hudson Canal Company's Gravity Railroad," *Proceedings of the Canal History and Technology Symposium*, Volume II, March 26, 1983, pp. 129-203).

In his letter of February 5, 1847 to President Wurts, James Archbald reports that the engines on Planes Nos. 1-5 "have all been increased in power [to 50 hp., says *Steers*], and are to be still further increased this [1847] winter [to 75 hp., says *Steers*]."

The horse power of the five stationary engines on Planes 1-5 on the Gravity Railroad when it opened in 1829: 30, 35, 35, 25, 35.

Engineers on Planes 1-5 when the Gravity Railroad Opened

In the obituary of Orlando Foster that was published in the *Carbondale Advance* (April 6, 1872, p. 3), we read: ". . . Thus has passed away the last of the early engineers on the Mountain section of the Del. & Hud. C. Co.'s Railroad—of those in service in the year 1837, the date when our residence in Carbondale commenced. They were a body of capable and intelligent men, embracing, we believe, Gritman Brown at No. 1, James Johnson at No. 2, John C. Davis at No. 3, Peter Campbell at No. 4, and Orlando Foster at No. 5. [emphasis added] These embraced all the steam engines to haul the coal to the summit of the Mountain. Wm. Ball, esq. resident at No. 1, was then and for many years after Superintendent of all the engines. The positions held by these engineers were considered very honorable and lucrative, the best in the Company's gift below Superintendents. Of the men then Superintendents few survive, and none are now resident here. James Archbald, esq., who died at Scranton about two years since, greatly lamented, had general charge, James Clarkson, esq., now residing in Benton, was Superintendent of the Mines, John H. McAlpine, Superintendent of the Machine Shop, (but he soon after resigned and was succeed by James Dickson, esq.,) and R. E. Marvine, esq., now resident at Green Ridge, was Accountant and Pay master. Everything was then new, and all departments managed with great energy and economy. The operations were on a comparatively small scale. From 300,000 to 400,000 tons of coal was considered a fair annual product. But it was in those days that the solid foundations

were laid for the immense expansion that has since taken place, and those gigantic enterprises which now make the Del. & Hud. C. Co. the object of admiration, and its stupendous achievements one of the wonders of the age. / The men that thus laid deep the foundations for these great results, have nearly all completed their earth-work, and left to others their positions and responsibilities." (*Carbondale Advance*, April 6, 1872, p. 3). The complete obituary of Orlando Foster is given in the section on Plane No. 5 in the unit on the 1845 configuration of the D&H Gravity Railroad.

First Engineers:

"On the line of engines up the mountain, William Ball was Chief Engineer. He was engaged from one of the shops in New York on the first starting of the works, when quite young, to take charge of the five engines on the line. He declined coming until the Company gave him a bond of agreement to keep him in their employ six months. He remained in their employ his lifetime, between thirty and forty years, beloved and respected by all who knew him. Those in his employ were, at No. 1 Whitman Brown, who remained for a number of years, and then went to Honesdale, where he was killed by the cars. At No. 2 was James Johnson, who removed to Keokuk, where he died. He was assisted at No. 2 by Joseph Gillespie, who died at Providence a few months ago. [*Durfee* was published in 1875.] Afterwards by Patrick Archbald, who went to Michigan. They were succeeded by P. R. Farrer, who died there. No. 3 was run a number of years by John Davis, whose sons succeeded him and followed in the same line of business. No. 4 was run forty years ago by Peter Campbell; afterwards by James Cookson, and later by Mr. Ball, brother of William Ball. By a misstep he slipped into the machinery and in a moment was a mangled corpse. Orlando Foster, formerly from this neighborhood, ran No. 5 for a long number of years, and was, I believe, succeeded by one of his sons, all of whom are engineers. So it is that Mr. Archbald and all that line of skilful, energetic men have passed away and given place to others, with new and much improved machinery. The first engines were run by or with walking beams and heavy balance or fly wheels. The engineer had to use the starting bar every time the machinery was set in motion." (*Reminiscences of Carbondale, Dundaff, and Providence Forty Years Past* by J. R. Durfee. Philadelphia, Miller's Bible Publishing House, 1875, pp. 18-19)

First Engineers from New York City:

That these first engineers at the heads of the planes when the Gravity Railroad opened in 1829 were brought here from New York City is confirmed by a statement in the obituary of Jane Ball (born February 18, 1833, died February 24, 1909), daughter of William Ball and Mary Ann Smith. Therein we read: "Jane Ball was the daughter of William Ball and Mary Ann Smith. "Her father came here [Carbondale] from New York city with five other young men to erect the first engines on the gravity road. [He was the first engineer on Plane No. 1 when the Gravity Railroad opened on October 9 1829.] He was the only one of the party to settle here permanently in the employ of the D. & H. and was soon given charge as master mechanic of all the stationary engines on this side of the mountain. [For many years, William Ball was the superintendent of motive power and the first master mechanic of the D. & H. Gravity Railroad.] Her [Jane Ball]

grandparents were Captain Charles and Ruth Godfrey Smith. The former had charge of portions of the D. & H. work here for many years and built a section of the D. & H. canal before coming to Carbondale." ("Death of Mrs. P. C. Gritman Is Sad Loss to Community," *Carbondale Leader*, February 24, 1909). This important clipping is to be found in one of the Gritman scrapbooks, about which more will be said later in this volume.

2921

P. A. Philbin Talks about Brakes

In his remarks on September 4, 1915, at the meeting of The Gravity Men's Association in Scranton, P. A. Philbin said: "In the old days the car brake was simple in construction but somewhat uncertain in use. It was a swinging brake with a wooden shoe that pressed the top of two wheels of the car. Every fourth or fifth car in a train of thirty or forty cars was equipped with this brake. While it was in use the second runner—and there were usually three in a train—carried a leather strap over his shoulder to which were attached a number of blocks or 'sprags.' He also carried a 'puddler,' a notched piece of wood which was fastened on the front of the car between the topbeam and the brake-lever to keep the brake down. For years after this part of the Gravity line went into operation [the line to Archbald] the runners were provided with a stout hemp rope with a hook on each end which was fastened to the car and the cable as the cars went up the Carbondale planes. The brake in use when the line was abandoned was the invention of James Nicol, for many years a resident of Archbald. It was a double brake with the shoe pressing the eight wheels of the car from the bottom. / In the early days, the first car of every trip had a front board which projected forward about five feet, and on this the foreman of the trip sat. It was his duty to throw the switches, to keep the track clear and to give warning of danger to the other runners. It was while doing his duty as foreman that Charles Hallock, one of the most popular of the early runners, was killed. The use of this board was abolished by C. P. Wurts."

More on Sprags and Brakes:

(The Delaware and Hudson Company / Board of Managers / Inspection of Lines / June 2, June 5, 1927, p. 13)

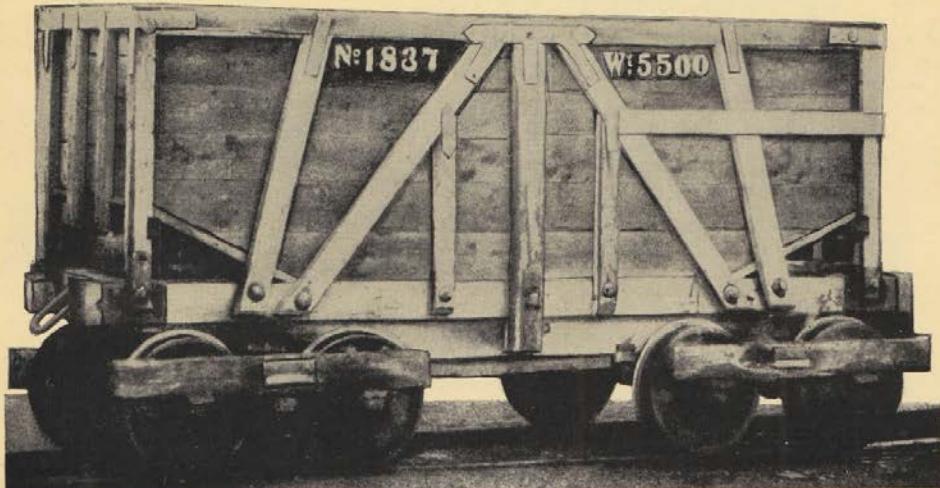
Period 1840 to 1850



N THIS period we find record of eight-wheeled coal cars on the Gravity road. The body was substantially built of wood, twenty feet eight inches long by four feet two inches wide. The weight was about fifty-five hundred pounds, the capacity ranging from four to five tons. The wheels were of cast iron, twenty-four inches in diameter; axles, two and one-half inches in diameter.

It was common practice to stop gravity trains by the use of pegs called "sprags." These were inserted between the wooden truck side frame and lug on face of car wheel and trainmen developed much dexterity in throwing them into place rather than stopping to position.

Sprags



Eight-wheeled Gravity Coal Car

Brakes

→ The majority of gravity coal cars were not equipped with brakes. The brake, peculiar in design, was of the pull-up type, having four solid cast iron combination brake heads and shoes which hung between the wheels and, when pulled up, effected a wedging action against the wheels, thus retarding movement. There were six levers (three on each side of car), one foot or power lever on the end, one cross bar, four yokes, eight adjusting bolts to take up the slack between shoe and wheel, and two equalizing chains and pulleys. Braking power was induced by pressure through the unique arrangement of levers and was controlled from the end foot lever by the brakeman. In making up trains, the cars with brakes were distributed at suitable intervals, dependent upon the length and weight of trains.

2922

If a Cut of Cars Stalled

What to do if a cut of cars stalled on a level between the head of one plane and the foot of the next. In the biographical sketch of George Lorenz on page 83-84 of the June 1, 1934 issue of *The Delaware and Hudson Railroad Bulletin*, we read the following: "Nowadays, when a freight train stalls on a grade the engineman has a number of alternatives: he can back down and get a fresh start, he can cut the train into sections and take up one at a time, or, if another locomotive is available, he can call for assistance. In the early days if a train, which ordinarily ran down the slope between adjacent planes by the force of gravity, stopped midway between, the runner had to walk to the foot of the next incline to get one of the powerful horses which were stationed there for emergencies of this type. Returning to his train he would start it with the assistance of the horse and then complete the interrupted run. Not infrequently the boys of the neighborhood, who frequently rode the cars along the levels, would deliberately stop a run of cars to annoy the crews. When one of the culprits was caught he was given a sound thrashing, although it is doubtful whether this discipline had any other effect than to cause him to repeat the prank at the very next opportunity. . . ."]

2923

Spring Switches in the Planes to Prevent Roll-Backs

In the biographical sketch of George Lorenz on page 83-84 of the June 1, 1934 issue of *The Delaware and Hudson Railroad Bulletin*, we read the following: . . . Oftentimes a cable or link would break and a string of cars would start back down the plane, gaining terrific speed in a short distance. To prevent any serious damage at the foot of the plane, traps were built in the track at intervals. These traps consisted of spring switches which were closed by the wheels of an ascending car but immediately opened again behind it, so that any cars descending the plane would be derailed. . . ."]

2924

John Torrey on the Planes on the 1829 roadbed

"The inclined planes were constructed with a single track, but with turnouts, and a short 100 to 150 feet of double track in the middle of each plane, to permit the cars moving in one direction to pass those moving in the opposite direction. These turnouts were provided with self-acting switches, or latches [emphasis added by the author], so that whenever a car passed out of a turnout in either direction, the switch was left in the right position to turn the next cars moving in the opposite direction into the side of the turnout thus vacated." (*Honesdale Citizen*, September 29, 1881)

"A Stationary steam engine was produced and used for motive power at each of the five long planes on the western side of the Mountain, which by means of a long chain extending the entire length of the plane, drew up three or four loaded cars, and at the same time let down a like

number of empty cars. / The three planes descending towards Honesdale were worked by gravitation, without the use of steam,—by having the descending loaded cars draw up the ascending empty cars attached to the other end of the chain, and the velocity of their motion was controlled by the use of friction brakes upon the shaft of a large, upright Fan Wheel." (*Carbondale Leader*, January 13, 1882, p. 4)

2925

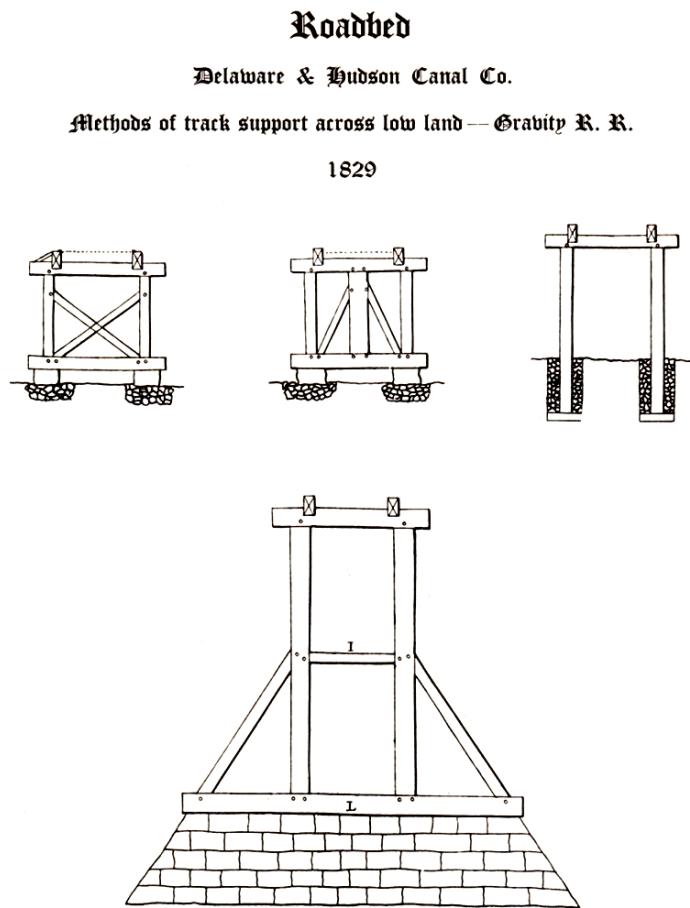
The Original Roadbed, Ties, Rails

"A plan of construction was adopted, designed to accomplish the object sought, with as little outlay as practicable. As at least nine-tenths of the entire distance was through unbroken forests, where timber could be very cheaply obtained, all heavy embankments for grade were dispensed with, and as far as practicable, without too short curves, heavy excavations were avoided. When the grade was more than four feet above the natural surface, trestle work of timber was used, and in some parts where the grade was still nearer the surface, wooden posts were placed upright in holes dug in the earth three or four feet in depth, and broken stones filled in around the posts—the tops of the posts being sawn off at the proper height to receive the cross ties upon which the rails were to rest. In other cases where the grade was near the surface, the cross ties, which were usually ten feet distant from each other, were supported by stone piers under each end."

"Upon these cross ties were placed wooden rails of hemlock timber, generally six inches in thickness and twelve inches in height, and either twenty or thirty feet long, so as to extend across two or three of the spaces between the cross ties. The rails were made fast to the ties by wooden keys, or wedges, and in such position that the space between the rails should be just the width of the gauge adopted, which was about four feet three inches. Upon the top, and at the inner edge of these rails, flat bars of iron, two and half inches wide and half an inch thick, were laid and made fast by large screws through holes for that purpose in the iron bars. After a little experience the hemlock rail was found to be too soft for a firm bed for the iron bars, and strips of beech [or oak] two inches thick and three to four inches wide were spiked to the top of the hemlock rail, and the iron bars fastened upon these beech strips. After a very little time the use of screws to fasten the iron bars was discontinued, and iron spikes used instead." (*Torrey*, 1882)

Side Note: In *The New-York Times* of July 15, 1886 we read: "RAILROAD TIES FOR SPAIN. / Ellenville, N. Y., July 14.—A firm of lumber dealers of this place has taken a contract for supplying 30,000 ties for a new railroad to the iron mines in the province of Arragon [sic], Spain. The ties are to be first quality oak or chestnut timber, and to be delivered by boatload via the Delaware and Hudson Canal at the New York docks."

Supporting the Roadbed (as mentioned by Jervis) across Low Land, 1829
(*Track and Roadway*, Published by The Delaware and Hudson Railroad, n. d., p. 29):



2926

James Archbald on the 1829 Roadbed

In his response to President John Wurts' request of February 5, 1847, James Archbald reported that the 1829 road was designed to carry 100,000 per year. "Agreeable to the request in your favor of 5th ult., I submit the following report, in which I have endeavored, as briefly as possible, to arrange and describe the various additions, alterations, and improvements which we have made upon our railroad, the reasons that induced, and some of the benefits resulting from them. Before, however, going into particular details, it may be proper to state generally, that the railroad was at first constructed for a transit business of one hundred thousand tons a year and that it required five years' experience, together with considerable improvement of its original arrangements before this amount of business was accomplished, while, with the changes now [1847] made and in progress, our present road will be equal to the delivery of five hundred thousand tons annually."

When the road opened on October 9, 1829, John Bolton was the president of the Delaware and Hudson Canal Company.

There were six presidents of the Delaware and Hudson Canal Company in the nineteenth century.

Philip Hone: March 11, 1825 to January 21, 1826
John Bolton: January 21, 1826 to April 13, 1831
John Wurts: April 13, 1831 to March 15, 1858
George T. Olyphant: March 15, 1858 to May 10, 1869
Thomas Dickson: May 13, 1869 to July 31, 1884
Robert M. Olyphant: October 24, 1884 to May 13, 1903

Officers and Managers of the D&H: April 9, 1831:

Officers: President, John Wurts; Treasurer, John H. Williams

Managers: Philip Hone, James Bryan, William Calder, Thomas Tileston, William M. Halstead, John Hitchcock, Samuel Reynolds, William Wheelwright, William Worrell, John Wurts, Allison Post, William Bradford, James Ruthven.

2927

Roadbed and Rails, 1829 (*Century of Progress*)

“The road was built with rails of hemlock stringers six inches by twelve inches set on edge and of twenty and thirty feet lengths, held together by cross ties at intervals of ten and fifteen feet, supported on posts set in broken stone or on stone piers. The running surface of the rails was protected by wrought iron straps two and one-half inches wide, half an inch thick, about fifteen and one-half feet long, secured to the wooden rail by wood screws. These bars were punched with slotted holes countersunk for the heads of the screws with which they were to be fastened to the wooden rails and the upper corners of the bars were rounded in rolling to a quarter circle having a radius of three-sixteenths of an inch. One end of each bar was finished with a tongue five-eighths of an inch wide and three-fourths of an inch long which fitted into an equivalent recess in the adjoining end of the next bar. The hemlock proving too soft, strips of hard wood one and one half inches thick and four inches wide were later spiked to the top of the hemlock rails and the iron bars were spiked to these hard wood strips. This construction, with wooden rails and trestles at many points, was found to be inadequate evenly to sustain the weight and thrust of the locomotive and was considered unsafe. Very reluctantly, the Managers of the company found it necessary to abandon, for a number of years, the use of locomotives upon this railroad.” (pp. 55-56)

Casting Wheels for Gravity Railroad Cars:

In *Hitchcock*, Volume II, p. 329, we read: "The first foundry [in Carbondale] was established in the village in 1833 by Alanson Reed, a Methodist preacher, and Abiran Guernsey, proprietors. It was located on Church and Foundry streets, and was principally employed in casting wheels for the Delaware & Hudson cars. Reed & Guernsey dissolved partnership February 14, 1834, the firm becoming Eggleston & Reed, William Eggleston having purchased an interest. Later the firm became Eggleston & Wilbur, who in August, 1837, sold to Pierson & Co., who operated the foundry as the Luzerne County Stove Foundry. Later the firm became Pierson & Benjamin, T. Benjamin & Co., and on April 3, 1873, J. B. Van Bergen & Co."

2928

General Remarks on the 1829 Roadbed

"The entire length of the railroad from the mines at Carbondale to the basin in Honesdale was 16 7/8 miles. At the time the road was built, it was calculated to afford ample facilities for transporting 100,000 tons of coal per year, that quantity being deemed as great as it was needful to provide for." (*Torrey*, 1882)

Dr. Steers (p. 144) says the road was designed "to transport 540 tons of coal per day, or 108,000 tons per year, of two hundred working days..." Dr. Steers then adds (p. 144): "Prior to the building of the railroad twenty or thirty teams were engaged in conveying coal from the mines to the canal in loads of from 1 to 2 tons each. The cost was \$2.20 per ton when sledges were used upon the snow and \$2.75 when wagons were employed. This slow and tedious means of transportation made the coal cost the company a total of \$5.25 at tidewater. Only 7,000 tons found its way to market during the year 1829."

Important Source Note:

In the *Carbondale Leader* of January 13, 1882 (p. 4), there is an article titled "THE GRAVITY IN EARLY TIMES." Here, written by the editor of the *Carbondale Leader*, is the first paragraph of the article: "The following article from the pen of John Torrey, Esq. of Honesdale, was contributed to the *Citizen* of that place, from whence we copy it for the benefit of our local readers,—some of whom have personal knowledge of the incidents so vividly reproduced by the venerable writer:" Here are the first two paragraphs of John Torrey's article: "The first running of a locomotive on a railroad in America, was on August 8, 1829, when Horatio Allen, Esq. ran the locomotive 'Stourbridge Lion' upon the Del. & Hud. Canal Co.'s railroad out of Honesdale toward Prompton. / Mr. Allen's recent visit to Honesdale, to see the place where he made that memorable trip, has made clear the fact that very few of our people have any accurate idea of the

precise location of that first railroad between Carbondale and Honesdale, or of the manner in which it was built; and I presume that some of your readers will be interested in a brief description of it, the material facts for which are largely obtained from data furnished by J. Archbald, Esq. [in his letter of February 5, 1847 to D&H President, John Wurts], when he was the chief engineer and superintendent of the road."

Presented herein are numerous citations from the 1882 John Torrey article, in which is found a large quantity of facts reported by Torrey on the basis of his own research or reported by Torrey from James Archbald's letter of February 5, 1847 to President John Wurts.

It's important to know that John Torrey's article was liberally used by Alfred Mathews in producing Chapter IV (pp. 221-256) of the Wayne County section of his monumental *History of Wayne, Pike and Monroe Counties, Pennsylvania*, published in 1886. Mathews, be it known, quotes from Torrey exactly, even though he does not acknowledge Torrey as a source. Mathews, in addition, provides a large quantity of valuable new material on the D&H.

In speaking of Torrey's account, Philip Ruth (*Of Pulleys and Ropes and Gear*, 1997) says, p. 22: "One of the most comprehensive and reliable profiles of the D&H Company's new railroad is found in a paper published by Honesdale historian John Torrey in 1892. Torrey described the route of the railroad as follows (taken from a 1951 transcription by Gerald M. Best):" Ruth is not correct when he says that the John Torrey article was published in 1892. The John Torrey article was originally published in 1882. Dr. Steers quotes exactly from the original John Torrey article as reprinted in the *Carbondale Leader* of January 13, 1882, but gives (p. 145), incorrectly, the original date of publication in the *Honesdale Citizen* as December 8, 1891.

Ruth quotes Gerald M. Best who quotes Torrey. Best's transcription in 1951 of the Torrey article is not exact: wording is changed here and there, data are omitted. So, instead of referring to the Best transcription, which was repeated exactly by Ruth, it is surely best to look at the original text of the Torrey article, as originally published in the December 8, 1881 issue of the *Honesdale Citizen* and reprinted exactly on page 4 of the January 13, 1882 issue of the *Carbondale Leader*.

Interesting note on the running of the Stourbridge Lion:

Horatio Allen's running of the Stourbridge Lion on August 8, 1829 in Honesdale is well documented. On July 30, 2013, the author received the following e-mail from Michael L. Brody [Michael.Brody@kohler.com] about his ancestor, William Henry Davies, grandson of John C. Davies, and son of Edward Y. Davies:

"Thank you for taking the time to talk to me yesterday. I have attached the document we discussed yesterday. This was a party thrown for William Henry Davies for his 50 years of service with the company [the D&H]. He was the Treasurer, and went on to work another 10 years for the D&H. As you can read they mention his grandfather, John C Davies as one of the

first to drive the Stourbridge Lion. Per my research, I cannot find any other person noted that drove the train, and as noted he was one of the first if not the first. I would like to see this put to historical documentation as we believe it to be significant both rail and transportation history. Let me know your thoughts on this."

Here is the text of the note in the dinner program on the occasion of the party that the Davies family hosted for William Henry Davies on his 50 years of service to the D&H:

"Long and faithful service deserves recognition.

William Henry Davies has for fifty years served the one organization and served with faithfulness, ability and integrity.

A railroad veteran, he descends from a family of railroad veterans. His grandfather, John C. Davies, served with the D. & H. from 1829 to 1867, when he died as a result of injuries sustained in the service. This ancestor had the enviable distinction and honor to be one of the first to drive the Stourbridge Lion. The son of John—the father of the man we honor tonight—was employed by the D. & H. for over thirty years. He was Edward Y. Davies, and proud he must be of his distinguished son.

'Bill' Davies, as he is generally referred to by his intimate friends, is beloved for his calm and happy disposition. Possessed of those rare qualities of character which withstand the onslaughts of modern foibles, he persists in his determination to adhere to strict traits of honesty. He likes to joke but is quick to condemn all foolishness and innovations emanating from brains which rattle. He steadily plods his way forward to a great fulfillment of a unique career.

Born in Carbondale, PA., April 7th, 1869, he entered the service of the D. & H. at 26 Courtland Street on January 25, 1887. Constant effort and struggle and application to duties finally brought him to the Treasurership of the company, which first employed him. His services with this company constitute a perfect record.

He has found time to devote himself to civic affairs and, has been honored by being elected Mayor of Westfield, New Jersey, where he has made his home for many years.

On October 4, 1892 he married Florence Jane Cubberly, and this union has continued happily for forty-four years. Two sons and one daughter resulted from this union, and all three children have made it possible for Mr. and Mrs. Davies to be known as Grandpa and Grandma.

Tonight his friends formally acknowledge a successful career attained in an unselfish manner.

Hats off to a gentleman of the old school!"

E. D. LeRoy Description of 1829 Roadbed

Another remarkable description of the 1829 roadbed is given by E. D. LeRoy in the third of a series of articles that he wrote for *The Monthly Bulletin of the Commonwealth of Pennsylvania Department of Internal Affairs*, beginning with the October, 1945 issue (later reprinted in the *Carbondale News*). Here is that article:

"Steel or even soft iron rails were unknown then [1829], so the road as Jervis originally built it consisted of 6 x 12 inch stringers of hemlock set on edge to form the rails. These stringers which were twenty to thirty feet in length were notched into heavy cross ties to which they were secured by wooden pegs. The crossties were placed ten to fifteen feet apart and were in turn supported by wood or stone piers and thus the whole structure was held clear of the ground to prevent rotting. The running edge of the rails was protected from wear by a strip of strap iron one-half inch thick by two and one-half inches wide and was secured to the rails by countersunk screws. / The planes on the original gravity road had double parallel tracks whereas the single tracked levels were provided with sidings. . . [No. In 1829, the planes did not have double parallel tracks. *Shaughnessy*, pp. 35-36: "Each [plane] was a single track, with a section of double track for passing, about 150 long, midway. . . [T]he two cuts of cars [loaded and light] would pass on spring-operated passing tracks in the middle of the incline." There was a short passing siding in the middle of each of the three single-tracked levels.] Stationary steam engines were located at the summit of each of the first five planes. Each engine operated by two huge drums placed in tandem, being eight feet in diameter and having a flanged rim nine inches wide. Around each pair of these drums a huge chain made three turns thence passing to the foot of the plane where it was attached to a trip of loaded cars. The other end of the chain was attached to a like number of empty cars being lowered which acted as a counter balance and thus left only the dead weight of the coal to be overcome by the hoisting engine. Only one of the drums was geared to the engine, the other acted merely as an idler helping to create friction and prevent the chains from slipping. / On planes 6, 7 and 8, where the loaded cars were descending, no motive power was required. A braking system was provided, consisting of two drums similar to those of the powered planes but connected merely to a heavy brake. / Considering the lacking of experience with such contrivances, the hoisting engines and drums seem to have been a reasonable success, but the chains were an absolute failure and were discarded in favor of ropes after having been in use only a few months during 1829. Concerning them, Dr. Benjamin Sillman wrote to Mr. Hazard of Philadelphia during July, 1830: / 'Last year there was much inconvenience from chains by which the steam engines draw up the coal wagons from the mines; during the season about fifty coal wagons were dashed to pieces in that manner, and when chains parted the wagon could not be seen in its descent; so instantaneously did it dart to its goal, that only a dim streak could be traced any longer occur.' / On December 12, 1830, John Bolton, the president of the company, wrote to the Governor of New York a letter in which he said: / 'Our railway has fully met our expectations, since the substitution of ropes for chains on the planes. The change, however, which was effected at the close of the winter was very expensive.' / Expensive they must have been and cumbersome also for these ropes measured seven and one-half inches in circumference. To protect this investment in ropes, although they were bound with

cords and heavily tarred, were carefully taken in each Saturday night and not brought out again until Monday morning the 'Gravity' like the canal, did not operate on Sunday. / The ropes, while they greatly lessened the danger of runaway cars brought a new difficulty in that they were frequently slipping on the drums, particularly when they were wet and not until the expedient of connecting the idler drum to the driven drum, by means of a rope belt, was struck upon, did they overcome to a great extent this difficulty although that danger remained until years later when the huge ropes were replaced by the first steel cables made by John Roebling. / The grade on the 'levels' ranged between twenty-four and forty-five feet to the mile and here again the company met another difficulty for as the name of the road implies the cars were allowed to descend by gravity and their speed had to be controlled. Various schemes were tried, amongst them being an elaborate windmill affair, connected to the axles by ropes or belts and retarding the speed by friction. Of this contraption a contemporary wrote 'it is a new and ingenious application, by Chief Engineer Jervis, of a known power, to the descending levels, which may well deserve the name of an invention.' This idea was soon discarded and a simple brake using the pressure of a bent sapling applied directly on the wheels came into general use. / The next improvement on the railroad was the addition of a 2 x 4 oak strip to the running edge on top of the original hemlock rails which were soon found to be too soft. The protecting strap iron was replaced on top of the oak and this arrangement served for many years."

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Whiting's Description of the Operation of the System

Whiting in the *Cassier* article, pp. 87-89, pp. 93-96. This article contains more detail on the planes and the operation of the planes and the engines than any other account that we have seen. Based on the information provided by Whiting in this article, one could, it seems probable, reconstruct a gravity plane. Whiting, in addition, describes a ride over the entire system from Carbondale to Honesdale and return.

A biographical sketch, and photograph, are given of Whiting on page of 83 of the article: "CHARLES W. WHITING, graduated at Stevens Institute of Technology in 1884, and subsequently served as draughtsman, inspector and engineer of tests for Dr. E. D. Leavitt, the consulting engineer of the Calumet and Hecla Mining Company. For the past year Mr. Whiting has been located at Carbondale and has thus had special facilities for becoming acquainted with the railroad of which he writes."

The connection of the D&H with the Hecla and Calumet Mining Co., the company for which the consulting engineer for whom Whiting worked (Dr. E. D. Leavitt) dates to 1887, perhaps earlier, when the Calumet and Hecla Mining Company had made, at the Dickson Manufacturing Company in Scranton, the largest boiler in the world.

"The largest boiler in the world was shipped last week from the shops of the Dickson Manufacturing Company, Scranton, to the Hecla and Calumet Mining Co., of Calumet, Michigan. It was made of steel and weighed 92,000 pounds." (*The Journal*, December 1, 1887, p. 3)

Here, then, is Whiting's description of the D&H Gravity Railroad [largely about the 1868 configuration but also about earlier configurations of the line] and a ride over the system:

"The planes were double, that is, they had two tracks which were operated together, one for the ascending and one for the descending cars. At the head of each plane, there was a pair of iron drums or sheaves, about eight feet in diameter and of nine-inch face. They were placed tandem, like the wheels of a bicycle, and on parallel shafts, and the cable, by means of which the cars were hauled, was wound around them three times, with one end at the head of the plane and the other extending to the foot. The ascending and descending cars, being attached to the two ends of this rope, tended to balance each other and the lack of balance was controlled by the sheaves. One of the sheaves was simply an idler and served to fleet the rope along on the other sheave, so that the three turns could be taken and the increase of friction gained between the main sheave and the rope. / At the planes on the west side of the mountain, Old Nos. 1, 2, 3, 4 and 5, where the ascending cars were loaded and the descending cars were empty, the main sheave was driven by a pair of horizontal engines through a spur wheel on its shaft and a pinion on the engine shaft. At the planes on the east side, Old Nos. 6, 7 and 8, where the ascending cars were empty and the descending cars were loaded, no motive power was required and the main sheave in this case was controlled by a brake such as is now used for the same purpose. / On the west side, where the hoisting was done, there was trouble from slipping of the rope. As will be seen, the rope really had only three half-turns by which to take hold, for the other three halves were on the idler and therefore of no use. This slipping was severe in the early days of manilla [sic] ropes, especially in the winter when ice could accumulate on them, and a sort of clamp was arranged by which the rope could be taken hold of and brought to rest. This, of course, only prevented the trip from running away and did not secure the rope from slipping on the sheave. The sheaves were then altered slightly. A flange, with a groove around the outside of its circumference, was bolted to each sheave, and in this groove an endless rope was run around the two sheaves. This was made very tight and was called a 'tightening' rope. It was, however, a driving rope to drive the idler and thereby give more active friction to the hoisting rope. This device was quite successful. / There are now [1895] only two pairs of these sheaves in use on the road, although the same idea in an improved shape has been used for hoisting engines in various parts of the country up to the present day. / In the earliest days of the road, long chains were used to haul the cars, but, being awkward to handle and costly to repair, they were soon replaced by manilla ropes seven inches in circumference, overlaid with other ropes three-eighths of an inch in diameter and covered with coal tar. They were so treated to protect them against wear and weather, and yet they were taken indoors every Saturday night and brought out again on Monday morning. / On the 'levels' the grade was in favor of the loaded cars, the empty ones being drawn back by horses. From the foot of Old No. 7 the 'level' was six miles long to the head of Old No. 8. The road here was single tracked with sidings or turnouts, descending at a grade of forty-four feet to the mile, sufficient for the running of loaded cars by gravity, the empties being returned by horses. Each horse drew four coal cars and a horse car on which it rode back. From the foot of Old No. 8 to Honesdale, nearly four miles, the grade in favour of the loaded cars being but twenty-six feet to the mile,

horses were used both ways, five cars in either direction being a train. It was the intention to use locomotives on this part of the road, but after a trial, the idea was abandoned. The road, however, has the distinction of having run the first locomotive in America, the 'Stourbridge Lion,' named after the town of Stourbridge, England, where it was built, and the face of a lion which adorned the front of the boiler. It was turned out in 1828 by Foster, Rastrick & Co., under the direction of the late Horatio Allen. . [Whiting then describes what he sees as he rides over the mountain and to Honesdale. Here is that wonderful description.] ."Leaving the station at Carbondale, the start is very gradual as we crawl away towards the foot of No. 1 plane. At this point there is a man waiting for us and for the coal cars as they come along. It is his duty to signal to the head of the plane, where the hoisting engines are, and to attach the trains or trips to one of the two ropes which run up the plane between the rails. As we come to rest, he gives the signal by pulling on a bell wire which leads up the plane to the engine house, and then makes us fast to the rope. This he does with a sling, a piece of chain five feet long with a hook on each end. One hook engages with a link in the forward end of the car and the other with one of several links in the wire rope as it comes along. Of the two ropes mentioned, one is the hoisting rope and the other is a tail rope. The hoisting rope extends from the links where we take hold and to which it is secured by a rope socket, up the plane to the drum of the hoisting engine. Here the end is made fast by passing it through a hole in one end of the drum and lashing it to the drum shaft. At the other end of the drum, is another hoisting rope, secured in the same way. This rope, however, is wound up on the drum, all but enough of it to run to the 'knuckle,' where it is also fastened to a set of links. From these links, then, is the tail rope running down the plane to the foot, where it goes under ground around a tightening sheave and back to the links where we are. / The hoisting ropes are kept in good condition, and when they show signs of wear by the breaking of the individual wire strands, they are taken off the hoisting service and used as tail ropes. These tail ropes answer two purposes. They bring down to the foot of the plane the empty end of the hoisting rope, and also balance the hoisting rope, so that, as far as the ropes are concerned, the load on the engines is uniform and consists only of the friction of the ropes on the planes. The ropes are one and a quarter inches in diameter and are made of iron. They rest on cast-iron carrying sheaves, ten inches in diameter, and about twenty or thirty feet apart along the plane. / By now we are moving, and, as the car assumes the inclination of the plane, we find it more comfortable to lounge back in our seats. The angle is not unpleasant, being only one in twelve from the horizontal. We are hoisted up the plane at a speed of about twenty miles an hour. The coal is handled in the same manner, five cars of five tons capacity each making a 'trip.' Of these cars one has a brake for controlling it and its companions as they run down the grade on the 'levels' and on the 'light' track on the west side of the mountain. / As we pass the 'knuckle,' that is the head of the plane, a brakeman, who is on our car, unhooks the sling, while we and the rope are still in motion, and we run along by the force of inertia and gravity. We have come up one hundred and nineteen feet, and traveled fourteen hundred and seventy-nine feet horizontally, and are now running along a 'level,' having a grade of about fifty feet to the mile, to the foot of No. 2 plane, a distance of sixteen hundred and forty-eight feet. Arrived there, we find another man awaiting us and we are hoisted up No. 2 plane in a similar manner. / Passing the 'knuckle,' we

run along as before on a short 'level' to the foot of No. 3 plane. We keep on climbing in this manner until we have reached the head of No. 8 plane, which is the summit of the system and the top of Moosic Mountain. From the foot of No. 1 plane we have come up seven hundred and fifty feet and have traveled a little more than two miles horizontally. / Before going further, let us look into the engine house at the head of this plane and see what sort of machinery has been helping us up the mountain side at such a lively rate. We will find there the same kind and amount, almost exactly, as would be seen at any of the other places that have been passed. There is a pair of 18 x 36-inch horizontal engines, with their cranks at 90 degrees apart on a common shaft. Their valves are ordinary side valves, each driven by a pair of eccentrics through a link for reversing. On the crank shaft is keyed a pinion which drives a spur wheel keyed to the drum shaft, the reduction being about six to one. The drums are ten feet in diameter and from six to nine feet long, varying with the length of the plane. The boilers are thirty-four inches in diameter and fifty-feet long, externally fired, with return tubes. / Taking our car again we run along by gravity, under the control of a hand brake, until we reach Farview, the first regular station. From Farview we are lowered down planes Nos. 9, 10, 11 and 12, reaching Waymart a drop from Farview of about five hundred feet. As these planes are only for lowering the trips, they are, of course, not fitted with hoisting engines, but with the brakes previously mentioned. These consist, in the first place, of a drum about ten feet in diameter, upon which the ropes wind and unwind. At one end of the drum is a spur wheel, slightly larger in diameter, which gears with and drives a pinion, about two feet in diameter, keyed to a shaft. This shaft carries a fan and a brake wheel. The fan is twelve feet in diameter and has eight blades. It serves as a drag to the motion of the drum. The brake wheel is encircled by a wrought-iron band, made fast to some part of the frame, but so arranged that it can be tightened about the brake wheel by means of a lever. The latter is controlled by the brakeman in the head house. / From Waymart to Honesdale, a distance of ten miles, there is one continuous down grade of about forty-four feet to the mile, and the ride over this is most enjoyable. Returning, Plane No.13 takes us up and out of the town [of Honesdale] immediately. This is the steepest of all the planes, rising about two hundred feet. Then comes one of the pleasantest runs on the road, the 'level' from No. 13 to No. 14, something less than three miles long. On the return trip we are hoisted up planes Nos. 14 to 20 inclusive, and run along the intervening 'levels' before we reach the summit of the mountain. From Farview to Carbondale we run over the 'light' track before spoken of, a continuous down grade of fourteen miles. / The trip is a pleasant and instructive one, and our thanks are due to Superintendent C. R. Manville and N. L. Moon, his assistant, as well as to other employes of the road, for their kind attention and assistance."

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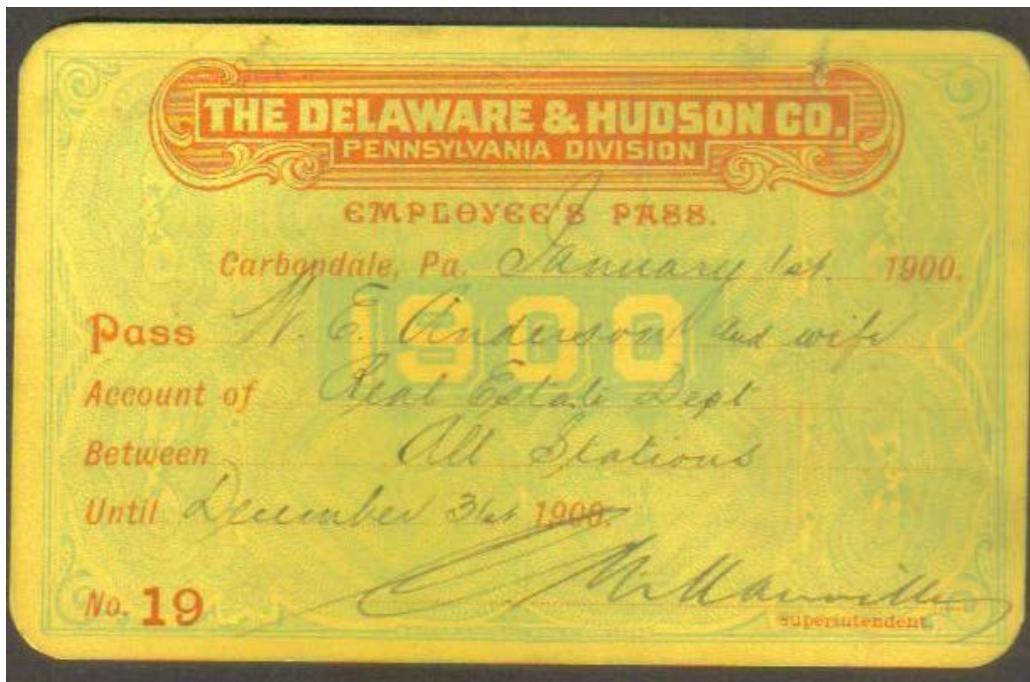
W. E. Anderson Talks about How the Planes Were Operated

"In operation, the planes were a distinct departure from the planes later constructed at Mauch Chunk and at Portage. The cars to be raised or lowered were attached directly to the cable by means of a short piece of chain known as a 'sling,' no 'safety car' nor barney truck being used.

An endless cable passed over small sheaves, located in pairs, between the rails, which revolved in opposite directions. Large sheaves around which the cable turned were located beyond the top and foot of the planes. The sheave at the lower end was on a moveable carriage, which, a cable attached to a 'balance box,' took up the slack when a train was attached to the main cable, and kept it taut. A large drum, usually located at the head of a plane and in line with the track, controlled the movement of the main cable which was wound around it. The main cable was in two sections, one-half being a heavy section, one and one-quarter inches in diameter for controlling the trains, and the other half, known as the 'tail rope,' being one of smaller diameter or an old main cable. The drums could revolve in either direction, and, one end of the main cable being at the opposite end of the plane from the trip of cars which it had raised or lowered, continuous operation was obtained upon a single plane. / For raising the loaded train, the drums were driven by stationary steam engines of the reversing type, except at the planes where water wheels were employed. The shaft of the drum controlling the descending movement was connected by a rope or cable belting to a large wooden fan wheel, the rapid revolutions of which created sufficient air resistance to keep the trains under partial control, complete control being obtained by means of a differential hand brake attached to the shaft of the drum. The 'slings' were heavy chains with a peculiar shaped hook at each end which permitted it to be easily detached at the head or foot of a plane. For ascending trains, one end of the sling was attached to the front of the leading car and as the main cable slowly moved forward, the other end was hooked into one of the links of the chain section. Connection being made with the train, the speed of the cable was increased. As soon as the last car of a trip passed over the head of a plane, the cable was stopped and the sling detached from the moving train, an operation that required considerable ingenuity. For descending trains the sling was attached to the rear car. / Upon the longer levels, the short trips of cars which had passed over the planes were made up into trains of fifty to eighty cars and, in charge of a conductor and two runners, moved forward to their terminus by gravity. / The coal cars had a capacity of about four tons and were peculiar in their construction. The wheels, eight in number and hung four to a truck, were cast with lugs on the outer face and were outside the car body. The ends of the bolts securing the wheel boxes projected an inch or so above the truck frame so as to afford a grip for the feet of the 'runners' when getting on and off the moving train, there being no steps and only a crude hand rail. The brakes were operated by both hand and foot and consisted of a frame extending around the sides and one end of the car and hung as a lever. On this frame was an iron lug engaging a ratchet on the car body, which held the brake set until released. The brake operated upon all eight wheels. All cars were not equipped with brakes and to bring trains to a stop, when there were an insufficient number of cars with brakes, large wooden pegs, called 'sprags,' were inserted between truck frame and the lug on the wheel, locking the wheel. This operation was performed from the ground as the cars went by. The men riding the train were out in the open and there was no protection afforded against cold or unfavorable weather. . . Grateful acknowledgement is made to W. E. Anderson, assistant engineer, who, in his long association with the Company, has

gathered and preserved valuable information embracing the construction and operation of the Company's lines for various periods of their development, and, from his notes, has furnished the material for this article." (Our Own 'Gravity Road', pp. 9-10, *The Delaware and Hudson Company Bulletin*, July 15, 1925)

Note: The D&H pass, signed by C. R. Manville, for W. E. Anderson and his wife for all of the year 1900 and between all stations, now in the collection of the Carbondale Historical Society, is shown below:



In 1895 W. E. Anderson created the Gravity Railroad map volume that is now in the collection of the Lackawanna Historical Society. In 1901, W. E. Anderson created the map of the Honesdale Branch of the Delaware and Hudson Company that is now in the collection of the Carbondale D&H Transportation Museum.

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How did the system operate?

In an undated newspaper article titled "The Celebrated Gravity Road" (probably published in the *Carbondale Leader*, in 1899 or shortly thereafter, we can deduce from internal evidence in the article, hereinafter referred to as Gritman scrapbook) in the archives of the Historical Society, the author describes the operation of Plane 23 at Olyphant. What he says of that plane is true for all of the other planes in the system with stationary engines at their head:

"The method of operating trains on the Gravity Railroad is as follows: Cars are hauled to the foot of plane 23. . . They are hauled up plane 23 in trips of five cars each, by a [steam-powered]

stationary engine at the 'head' or summit of the plane, being coupled to a wire rope 1 1/4 inches in diameter, which rope winds around a drum in the engine house. There are two hoisting ropes on each plane, connected by what is termed a 'tail' rope, making altogether three ropes on each plane. The top is hooked on to one of these hoisting ropes by a five-foot chain called a 'sling,' the sling being caught in one of three links spliced into the rope. The rope that hoists the cars is stretched along the plane and another rope is coiled on the [large, cylindrical] drum, and unwinds down the plane as the one to which the 'trip' is attached winds itself on the drum as the cars go up the plane. The tail rope is always on the plane. [In the article title "A Builder Speaks about the Wheels" (*Leader* (?), Saturday, February 8, 1902, in the Gritman scrapbook, William Johnson, Sr. says "Before that time [1856], also, both light and loaded planes had to be used at the one time, the loaded cars being hoisted by power *while the empty ones carried the tail rope to the foot.* [SRP italics] In this year the endless wire ropes were substituted for the old hempen ones."] All the stationary engines are reversible, working alternatively in the forward and backward motion. When a trip is hauled to the head of a plane it gravitates into the foot of the next plane, an average grade of 40 to 50 feet the mile being maintained from the head of one plane to the next along the entire road. The method described is that followed throughout the system. When the cars get to the summit of the Moosic mountain, at Farview, there is a sudden drop of nearly 500 feet between that point and Waymart, a distance of nearly two miles. To let the cars down this steep declivity, four planes have been built. The mode of letting the cars down is similar to that used in hoisting them, except that a large fan is stationed at the head of each plane to regulate the momentum of the t[r]ip. These fans are controlled by brake drums and operated by men stationed at the heads. From Waymart to Honesdale there is a continuous descent for ten miles, of about 44 to 50 feet to the mile, and cars gravitate down to Honesdale."

[Slings are heavy] "Charles Vogle met with a painful accident Tuesday, dropping a sling upon his foot and breaking one of the small bones." (*Carbondale Leader*, July 21, 1887, p. 4)

[Lowenthal, p. 152, says ". . . John Roebling, a German immigrant who manufactured wire rope in western Pennsylvania, was already [in 1846] familiar to the company. Beginning in 1844 the D&H had purchased his wire rope to replace the cumbersome fiber ropes on the planes of the gravity railway." Before coming to work for the D&H, Roebling had built a suspension aqueduct for the Pennsylvania Canal.]

Roebling's wire rope on the planes in 1844? Where is Lowenthal getting this from? 1858 is the year that wire ropes replaced the hemp ropes.]

"At the head of each plane on this side of the mountain [Carbondale side] were powerful high pressure engines, with fly-wheels of ten or twelve feet diameter. The planes were at first supplied with chains to pull the loaded cars to the head. These were so liable to break, that a blacksmith was located on each plane to mend them. These breakages became so onerous that soon ropes were substituted. The ropes [used on the planes] were made only long enough to wind around a drum a few times, with a loop at each end, one reaching to the foot of the plane. Four loaded cars

were attached at the bottom of the plane, and four empty ones at the head, so as many empty cars were returned as loaded ones taken away. On the east side of the mountain the loaded cars in descending the plane brought up a like number of empty ones. A large brake was used by the headman to regulate its velocity." (Joslin/Davies)

The levels between the head of one plane and the foot of the next were "level" in the 1829 configuration; also on the "summit level"; the 4-mile level and the 6-mile level were sloped downward to the East. In the 1845 configuration, all levels were sloped West-East under James Archbald's direction.

2933

Frank Ball Tells How a Gravity Plane Operated

In the biographical portrait of Frank Ball that was published in the March 1, 1929 issue of *The Delaware and Hudson Company Bulletin*, pp. 67-68, 78, we read, on pp. 67-68:

"Today when we speak of a 'head man' we mean the trainman stationed at the forward end or top, of a plane. It was his duty to uncouple the load (generally consisting of five coal cars of standard gravity road size, or six if there was a small car among them) from the cable as the cars reached the top of the incline. This operation required considerable skill and quick action on the part of the headman. / In order to appreciate this fact we must know something about the operation of one of the gravity planes. At the top of the plane there was an engine house enclosing a stationary steam engine. An endless steel cable stretched from the bottom of the plane to a drum attached to the engine. When the drum was put in motion the cable circled the drum, thence back to the foot of the plane and up again. Large elliptical, steel corks or links were set in the cable at opposite points, so that when one was at the bottom of the plane the other was just going over the top. The man at the foot of the plane attached a length of chain to the head car in the cut and dropped the hook at the other end of the chain into the cork as it came by. When the cars reached the head of the plane the engineer 'slackened' on the cable for an instant, relieving the tension, so that the head man could bend over and with a snap of his wrist flip the hook out of the cork. The 'cut' then ran by force of gravity to the foot of the next plane where the operation was repeated. If it so happened that the cars ran hard and did not reach the foot of the next plane a horse was used to haul them in. / Suppose the cable should break, what then? Along the upward slopes there were 'traps' consisting of large blocks of wood set between the tracks, to which springs were attached. The wheels of the ascending cars struck the blocks, pushing them in toward the center of the track sufficiently to permit them to pass by. The result was a series of 'bumpety-bumps' as each successive pair of wheels striking the block shoved it out of the way, and it snapped back into place. In the event that the cars should start backward the block, when it reached a position at right angles to the track, was held rigid thereby stopping or derailing the cars. Sprags of wood, about one foot in length and pointed at each end were also used to block the cars."

Plane from the Mines to the Foot of No. 1

1829-1836

When the Gravity Railroad opened in 1829, there was a 300-foot long plane and a 2,000 foot long level, operated by horsepower, from the mines to the foot of Plane No. 1. Here is what Torrey said about that plane in 1882:

"Starting at the mouth of the mine at Carbondale, the railroad commenced with a short inclined plane 300 feet long, ascending 30 feet, (or 1 foot in 10,) which was operated by horse-power. From the head of this plane the grade was near the natural surface of the ground a distance of 2000 feet to the foot of steam plane No. 1, ascending in that distance 45 feet (or 1 foot in 44.) This grade was so heavy that is required one horse to each car carrying three tons of coal." (Torrey, 1882)

From Part I (August 5, 1899, p. 6) of P. S. Joslin's multi-part series of articles, titled "**CARBONDALE IN IS INFANCY. / A Series of Articles on the Early Days of the Anthracite City by One of its Pioneers.** [Contributed by P. S. Joslin.]," published in the *Carbondale Leader*, we learn the following: "The railroad, from the sweep, which stood near where the gas house now stands, crossed the river about where the Sixth Avenue bridge now is and ran close to the rear of all the stores on the west side of Main street to the foot of No. 1 plane."

Fire in the Sweep (building in which horses drew the cars from the coal mines):

"**Fire.** / On Monday morning, last, the citizens of Carbondale received another warning to prepare for their preservation against this fearful Destroyer of property. The house of Mr. Roth, opposite the Methodist church, was discovered to be on fire. It was however extinguished, without much damage. / Also, about one o'clock on yesterday morning, the building known as the "Sweep," belonging to the Del. and Hud. Canal Co. in which horses were used to draw Cars from the Coal Mines, caught fire and was entirely consumed.* The appearance of the fire was truly alarming, being situated within twenty feet of the wooden powder houses, containing between 3 and 400 kegs of powder." (*Northern Pennsylvanian*, Thursday, January 17, 1833, p. 2)

*As a boy, Thomas Dickson's first job for the D. & H. C. Co. was working for George A. Whiting at the sweep in Carbondale. In Thomas A. Logan's *The Life of Thomas Dickson. A Memorial* (Scranton, PA, 1888) we read (p. 21): "When [in the spring of 1836] the Dickson family were safely housed in their home of two-rooms and a kitchen in Carbondale, and the father [James, a skilled millwright] had found steady work [as a mechanic in the D&H shops] among the water-wheels and lifting sweeps of the Delaware and Hudson Canal Company [a sweep is a long pole or timber that is pivoted on a tall post and used to raise and lower a bucket], it was at once decided that Thomas should take up the broken threads of his education . . ." Thomas, accordingly, was enrolled in the village school taught by an Irishman by the name of John Welch. Following an incident in which Thomas Dickson was falsely accused of knocking over a row of small "bricks," Thomas Dickson decided that formal classroom education was not for him, and he sought work in the community. He spoke with George A. Whiting "who was

connected with the coal-works of the Delaware and Hudson Canal Company, and at once became interested in the spirit and energy of the boy. He gave him the job of driving the very large mule harnessed at the sweep, and used for lifting coal out of the mine." (*Logan*, p. 24)

1836-1853/54

Initially horses were used to draw the cars from the mines to the foot of Plane No. 1, but it proved too expensive to use horses and so in 1836/37 a water-powered hoisting engine was installed on the 1,000 foot plane from the mines ("the opening of which may still be seen in the base of the West Side bluff" said William Johnson, Sr. in 1902) to the foot of Plane No. 1. The cars were raised 80 feet by this waterwheel. (This water wheel was 300 feet north of the two waterwheels that were installed at the base of Salem Avenue in 1853.)

This waterwheel on the mine plane was the first waterwheel to be used on the Gravity Railroad.

"At the foot of old Number One plane [from the river to the foot of No. 1], records show that a fifty foot undershot water wheel was used for the first eighteen years [up to 1847] of the road's operation." (p. 181), ("Up Hill and Down Dale by Gravity Rail" by N. H. Hiller, Jr. (*The Delaware and Hudson Railroad Bulletin*, June 1, 1931, pp. 165-67, 172; June 15, 1931, p. 181-182, 188-189); this article was concluded in the July 1, 1931 issue on pp. 196-198.

1836-1837: water-powered hoisting engine installed on the 1,000 foot plane from the mines to the foot of Plane No. 1; cars were raised 80 feet; initially horses were used to draw the cars from the mines to the foot of Plane No. 1, but it proved too expensive to use horses and so the water-powered engine was used.

"The winter of this year [1837] was one of extraordinary severity. Game perished in the mountains, and great suffering was known in the valley. Snow fell to the depth of five or six feet upon the level, while drifts, crossed only on snow shoes, rose mountain high in many places. Of course travel was suspended; the public roads remained unbroken for weeks, and every avenue of drawing sled-loads of wood from the forest closed up." (*Hollister*, unpublished typescript, pp. 12-13)

"This short experience [the first years of operation, from 1829 up to 1837] also demonstrated that the use of horses to draw loaded cars up so heavy a grade as that of the short section extending from the mine to 'plane No. 1,' was unnecessarily expensive. / To remedy this, a plane to be operated by water power was constructed in 1837, 1,400 feet long, and ascending from the mouth of the mine nearly 80 feet in height, and from the head of this plane a new track 1,500 feet in length, to the foot of plane No. 1, was laid on a grade descending 1 foot in 250. / This improvement reduced the cost of transportation on that short section, at least two cents per ton." (*Torrey*, 1882)

In *Mathews*, p. 242, we read: "In 1836-37 he [James Archbald] constructed new planes at Carbondale, greatly facilitating the movement of coal cars." Mathews does not specifically state that these "new planes" were those between the mines and the foot of Plane No. 1, but since no

other "new planes" were constructed between Carbondale and Honesdale during those two years, it seems safe to say that James Archbald was the mastermind behind the 1836-37 water-powered plane from the mine to the Foot of No. 1. In addition, since James Archbald was the superintendent and resident engineer of the Gravity Railroad at the time, it follows that the construction of the 1836-37 plane from the mine to the foot of Plane No. 1 was carried out under his direction.

"Subsequent to these changes very little material alterations were made in the road before 1841. After 1841 very many changes were made, whereby the capacity of the road has been increased some *thirty-fold* over that for which it was originally planned; its present [1882] capacity being sufficient to transport three millions of tons of coal per annum." (Torrey, 1882)

2935

A Closer Look at the 1829 Configuration

We will now have a closer look at each of the planes in the 1829 configuration of the Gravity Railroad. At the head of the section about each plane, we will note the names of the engineers who worked at the head of that plane. We will also note the names, when known, of all others who worked on each of the planes and levels.

We will then focus on the plane itself and its associated level: location, characteristics, operating features. Following the section on the plane and its level, we will note accidents that are known to have taken place there.

The fact that we know the names of the engineers at the head of each of the planes in the 1829 configuration, as well as in the configurations of 1845, 1859 and 1868, is the result of one newspaper article that was published, probably in the *Carbondale Leader*, probably on Monday, February 17, 1902. That article, written by P. S. Joslin, is titled "Concerning the Gravity Railroad," and it was pasted onto one of the final pages in one of the Gritman scrapbooks, about which we will have a lot to say in Section 2957 of the present volume.

At the head of this article is the following note by the Editor of the *Carbondale Leader*: "No history of Carbondale can be written without embodying that of the old picturesque gravity road which was for years the delight of every tourist through this section. In its abandonment Carbondale sustained a loss that will be keenly felt while the present generation lives and the country lost a method of transportation that was unique and attractive. Much has been written in a general way of the building and operation of the road—yet little has been said of that faithful force of employees who managed it so successfully for many years. It is this long neglected and most worthy historical feature of the Gravity road that Mr. Joslin has undertaken to supply in the following article."

P. S. Joslin begins his article as follows: "On the first of January, 1899, the Delaware & Hudson canal company abandoned the famous gravity road as a means of transportation of coal between Carbondale and Honesdale. The road was completed in 1829, and the first coal passed over it in that year, so that it had been in use about seventy years. The dismantling of the road of its

engines and equipments began immediately, but its completion was not accomplished until about the first of January, 1900. It is now [1902] only a thing of memory. / It was suggested to the writer [Mr. Joslin] to give a history of the [Gravity] road and of its personnel. Many sketches have been published from time to time in our own papers, as well as in papers in other towns by tourists who have visited it. Seventy years [of operating time for the Gravity Railroad] is a long period to traverse, where no records are obtainable, and the early actors have passed away. To fulfill this request, an effort was made to obtain the names of the earliest operators along the lines of the road. During our recent semi-centennial celebration, E. Y. Davies, a former resident here, and all his life an employe on the road gave me the names of the earliest engineers."

Joslin then speaks of many different aspects of the Gravity Railroad, and mentions the names and positions of many Delaware and Hudson Canal Company employees:

"The Gravity was completed in 1829, having eight inclined planes, five on the west side and three on the east side of the mountain, overcoming an elevation of about 900 feet. At the head of each plane on this side of the mountain were powerful high pressure engines, with fly-wheels of ten or twelve feet diameter. The planes were at first supplied with chains to pull the loaded cars to the head. These were so liable to break, that a blacksmith was located on each plane to mend them. These breakages became so onerous that soon ropes were substituted. / The ropes were made only long enough to wind around a drum a few ties, with a loop at each end, one reaching to the foot of the plane. Four loaded cars were attached at the bottom of the plane, and four empty ones at the head, so as many empty cars were returned as loaded ones taken away. On the east side of the mountain the loaded cars in descending the plane brought up a like number of empty ones. A large brake was used by the headman to regulate its velocity. / Hans Johnson the father of William Johnson, was the first rope rigger. The ropes came here untarred. A walk was run from the bridge over Racketbrook to near where the Mitchell hose house now stands, over which the rope was stretched and tarred. After Mr. Johnson's death Robert McFarlane was appointed. / It was said Mr. McFarlane was not a practical rope rigger, but was ably aided by Patrick Garvey who was Mr. Johnson's foreman. He did not retain the position long, and was succeeded by Evander McLeod, who shortly afterward gave place to Hugh W. Powderly in 1864, and who held the position until the road was cleaned up in 1900, thirty-six years. From the summit to Waymart, about two miles, there is a descent of about 500 feet, accomplished by three inclined planes. Between Waymart and Honesdale, a distance of about ten miles, the cars descended by gravity. / James H. McAlpine was the first master mechanic, having charge of the shops at the foot of No. 1 plane. When he left the company's employ James Dickson was appointed. He held the position until age and physical ability warned him to resign. Thomas Hurley was his assistant, and had charge of the engines between Waymart and Scranton when that road was built. / Rollin Manville, father of the present superintendent, entered the service of the D. & H. company as assistant superintendent of the Gravity road between Waymart and Honesdale in 1856. / Under his instrumentality many improvements were made at Honesdale and other places. In 1864 he was made general superintendent of the Pennsylvania division of the road, which position he held until his death in 1891. His son, C. R. Manville, who had been his father's assistant from 1885, became his successor. / The first superintendent of motive power on the gravity road was James Goodfellow."

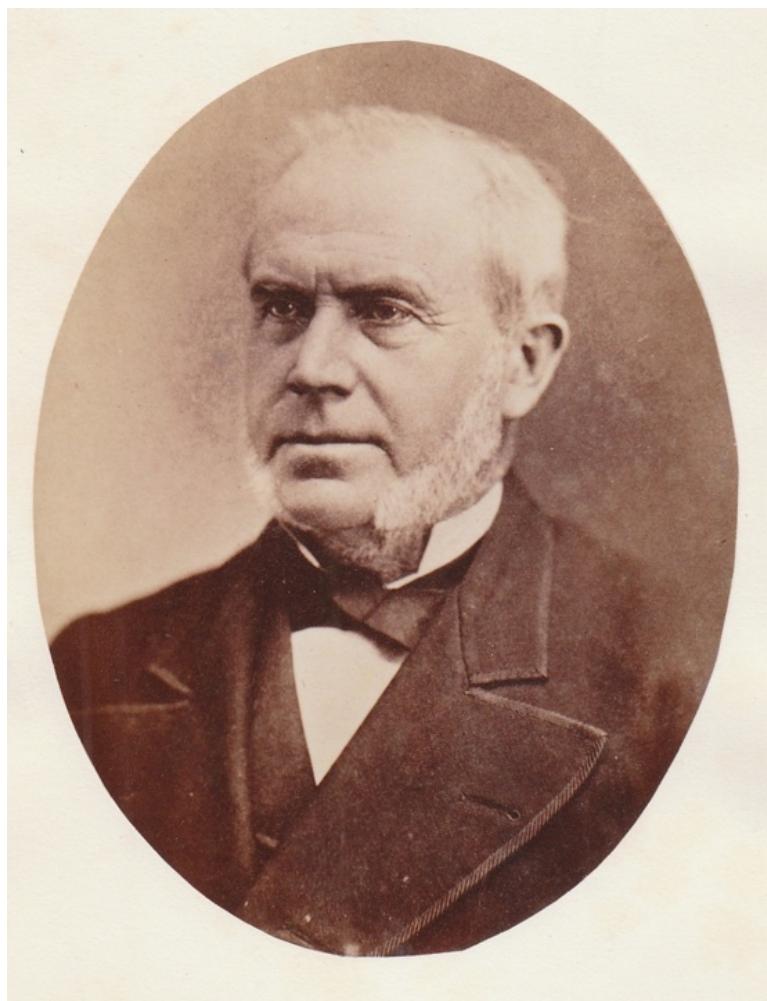
P. S. Joslin then names the engineers at the head of each of the planes of the Gravity Railroad in all of the configurations of the road—1829, 1845, 1859, 1868—in the nineteenth century. We will not name those engineers here. Rather, those data are given throughout the volumes in this series on the Gravity Railroad, at the head of each section on each plane. Those data there about personnel are given in quotation marks. Following the data, is the parenthetical reference (*Joslin/Davies*), which indicates that what we have reported there is from Joslin's extraordinary 1902 article.

Joslin then presents a lot of other very interesting information and data in his 1902 article, and credits Pierce Butler's diary as a highly useful reference source that he (Joslin) used in compiling his 1902 article. Joslin says the following: "In February, 1865, Pierce Butler was made superintendent of motive power on the retiring of Thomas Hurley. From the time of Mr. Butler's appointment to the abandoning of the road he had kept a diary of every important event under his supervision, such as change of location of engineers and appointments, accidents, etc., from which he kindly permitted us to make such extracts as would help us in maturing this sketch."

Additionally, we read the following in Joslin's extraordinary article: "In this year [1865] the new road was completed, whereby the empty cars from Honesdale were run on a separate track, by gravity, and the distance for loaded cars where five planes reached the summit, were then changed, so that eight planes were now used. The empty cars were now run to the company's mines down the valley to Peckville or Olyphant. This necessitated the building of several new planes between these mines and Carbondale. . . For a road with so many planes, and in operation seventy years, very few accidents occurred on it, endangering the lives of employes or passengers. One of the earliest in the memory of the writer, which resulted in a miraculous escape, was of an old man who lived up the line towards the summit. He had to be helped on and off the cars, when riding. At the foot of Nol. 1 plane the men fixed a seat for him on the top of a load of coal. When part way up the plane, something broke and the cars came swiftly to the foot, smashing the three lower cars to pieces, and scattered the coal all over the foot; but the car next the hook on which the old man sat was not even shaken by the crush. . . It is proper to name the successor of James Dickson, as master mechanic. Andrew Wyllie became his successor, but as the company's business and requirements increased, it became necessary to divide up their operations, so Mr. Wyllie retained only the blacksmithing department, which he held until his resignation a few months ago. Now there is the locomotive repair shop, the car repair shop, the car building shop, the passenger car shop, the paint shop, which are under as many different foremen. / With railroad corporations the track foreman is an important incumbent, for upon him depends the keeping of the road in good order. He has to keep a watchful eye over the whole of his section, to see that none of the track is out, or otherwise settled or out of order. In this connection it would not do to leave out the name of captain Smith. I do not think he was known

by any other name in Carbondale, outside of the company's book. He commenced as a contractor on the Delaware & Hudson canal, following it up with a contract in the construction of the gravity road, and when completed he was retained as track foreman, which position he held as long as his health and old age would permit." Note: Captain Smith was the father of John B. Smith, who became the Superintendent of the Pennsylvania Coal Company's Gravity Railroad.

Here is the photograph of John B. Smith by William H. Schurch that is given, facing page 235, of *Clark*:



The Wyoming Valley, Upper Waters of the Susquehanna, and the Lackawanna Coal Region, Including Views of the Natural Scenery of Northern Pennsylvania. Photographically Illustrated by Wm. H. Schurch. Edited by J. A. Clark. Published in Scranton in 1875. This is a volume of great importance in the history of northeastern Pennsylvania, and it is well to reprint here the announcement of the forthcoming publication of the volume that was published in regional newspapers at the time.

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So the remarkable facts are these.

P.S. Joslin probably would not have written this extraordinary article (*Concerning the Gravity Road*) that was published in the *Carbondale Leader* on Monday, February 17, 1902) if he had not been asked to do so by the editor of the *Carbondale Leader*.

Additionally, and most significantly, P. S. Joslin could not have written this extraordinary article

(1) if he had not spoken with E. Y. Davies at the time of the Carbondale Semi-Centennial celebrations in 1901 and learned from him the names of the earliest engineers at the heads of the planes on the Gravity Railroad,

(2) if Pierce Butler had not made available to P. S. Joslin the D&H diary that he (Butler) kept from 1865 to 1899. (One can not help but wonder if Pierce Butler's diary is still extant. Hopefully it will surface one day.)

It's one of those wonderful moments when a lot of the right factors come together and remarkable results are achieved. The historical record is greatly enriched because that article was written and published.

2936

Plane No. 1

There was a 30- horsepower engine at the head of the plane.

Engineers at the Head of Plane No. 1:

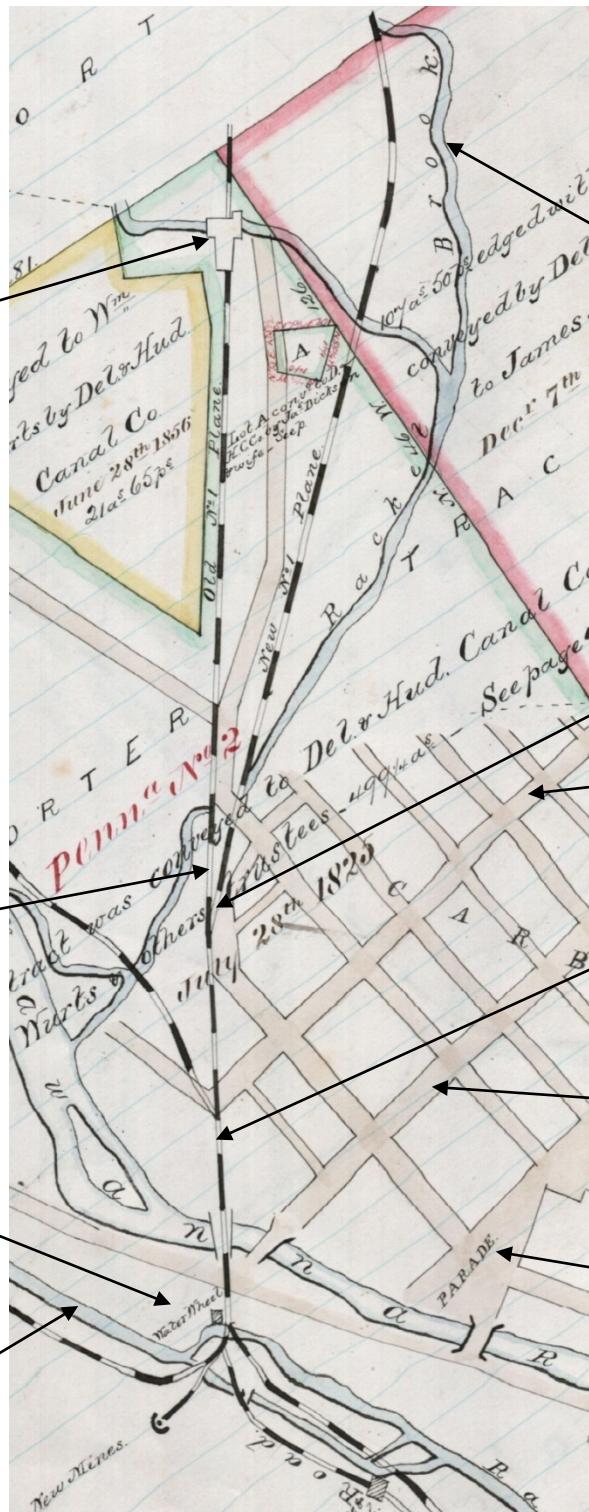
"The first superintendent of motive power on the gravity road was James Goodfellow. William Ball was the first engineer at the head of No. 1 plane; Mr. Goodfellow resigned his position after a few months, and Mr. Ball was made superintendent of motive power, which position he held until his death in 1859. Whitman Brown succeeded Mr. Ball as engineer at No. 1, who after a few years was transferred to Honesdale. John B. Smith next became engineer. When the road from Port Griffith to Hawley was built [the Pennsylvania Coal Company's Gravity Railroad] Mr. Archbald was made general superintendent. He selected from the D. & H. employees such men as he thought would be the best fitted for important positions on that road, and among them was John B. Smith. His upward grade from engineer, superintendent to president of the company, eminently testified to the foresight of Mr. Archbald in his selections. / Thomas Shearer, who was for a long time fireman at No. 1, succeeded Mr. Smith then followed Ulysses Campbell. James

Vannan became engineer at No. 1 in 1866, and retained the position until the road was abandoned in 1899." (*Joslin/Davies*)

"The foot of plane No. 1 was where passengers by the gravity road take the cars in Carbondale [in 1882], and was at an elevation of 87 feet above the canal in Honesdale, and 1057 above the tide level. / In ascending plane No. 1, a distance of 2000 feet, the grade was about 1 foot in 12, overcoming an elevation of 170 feet. This plane was located parallel to, and along the northwestern side of, the turnpike to Honesdale. [This plane is now called Sage Court and Copeland Avenue, which is one street to the left, as you ascend Canaan Street. In the 1895 Gravity Railroad map volume, this roadbed is called "Alley."] / From the head of plane No. 1 the track was nearly level for 600 feet to the foot of the next plane." (*Torrey, 1882*)

When the road opened in 1829, there was a stationary steam engine at the head of Plane No. 1. For a short period in 1845, there was a water wheel at the head of Plane No. 1. This waterwheel at the head of Plane No. 1 will be discussed elsewhere in this series of books on the D&H.

There was also a water wheel on the plane from the mines to the foot of Plane No. 1 [see Section 2934, above]. Both the water wheel and the plane from the mines to the foot of No. 1, as well as all of Plane No. 1 can be seen in the view of downtown Carbondale that is given below. This map detail is from the map on page 12 in *D&H Deeds Luzerne I*. The map illustrates a deed, pp. 1-6, dated July 28, 1825, between John Wurtz & others, Trustees, and The Delaware & Hudson Canal Company. The map contains details about several configurations of the Gravity Railroad. Here is that detail:



Head of Plane No. 1, 1829, 1845. Water coming from reservoir at top of Canaan Street. After providing the steam engine with water, the water then flowed down the bank to the Racket Brook

The source of the Racket Brook was No. 4 Pond

Foot of Plane No. 1, 1859, 1866

Present day Lincoln Avenue

Foot of Plane No. 1, 1829 and 1845

Level from the head of the plane from the mines to the foot of Plane No. 1

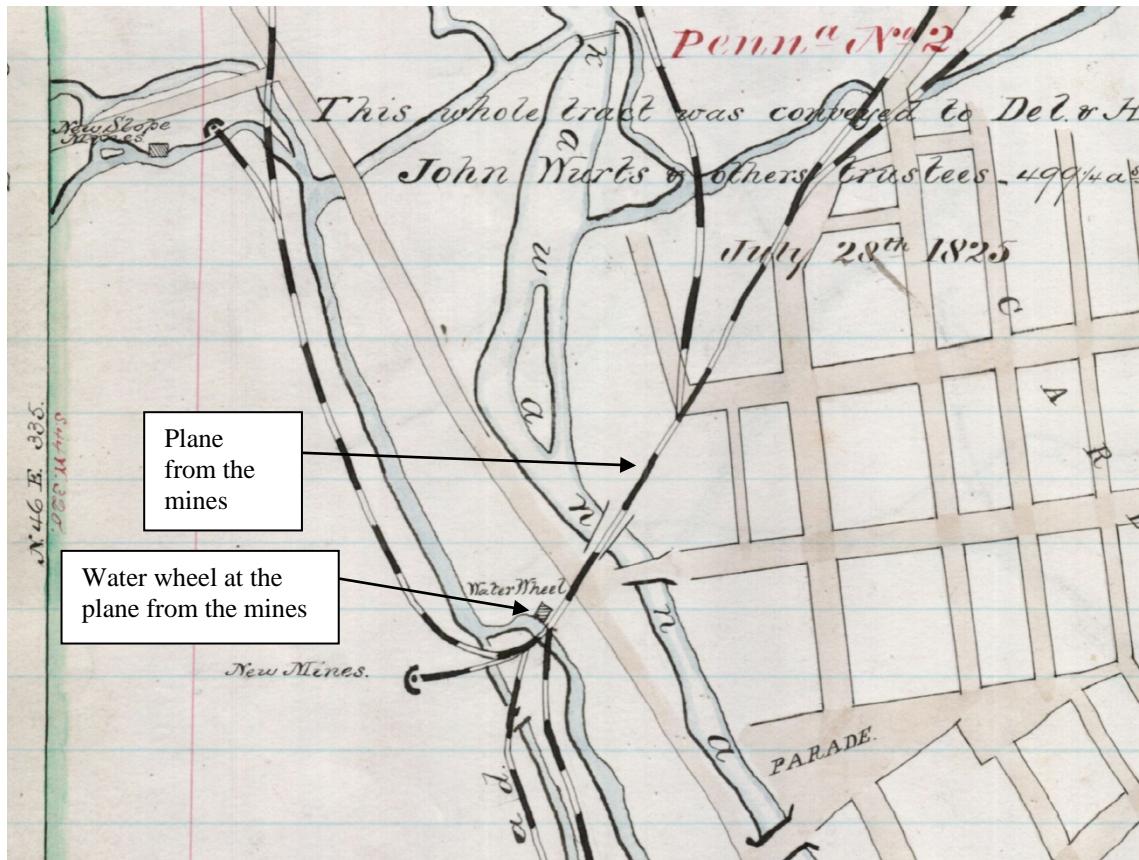
Water wheel that hoisted the cars from the mines nearly 80 feet in height. Once thus elevated, the cars rolled down the level to the foot of Plane No. 1.

Present day Salem Avenue

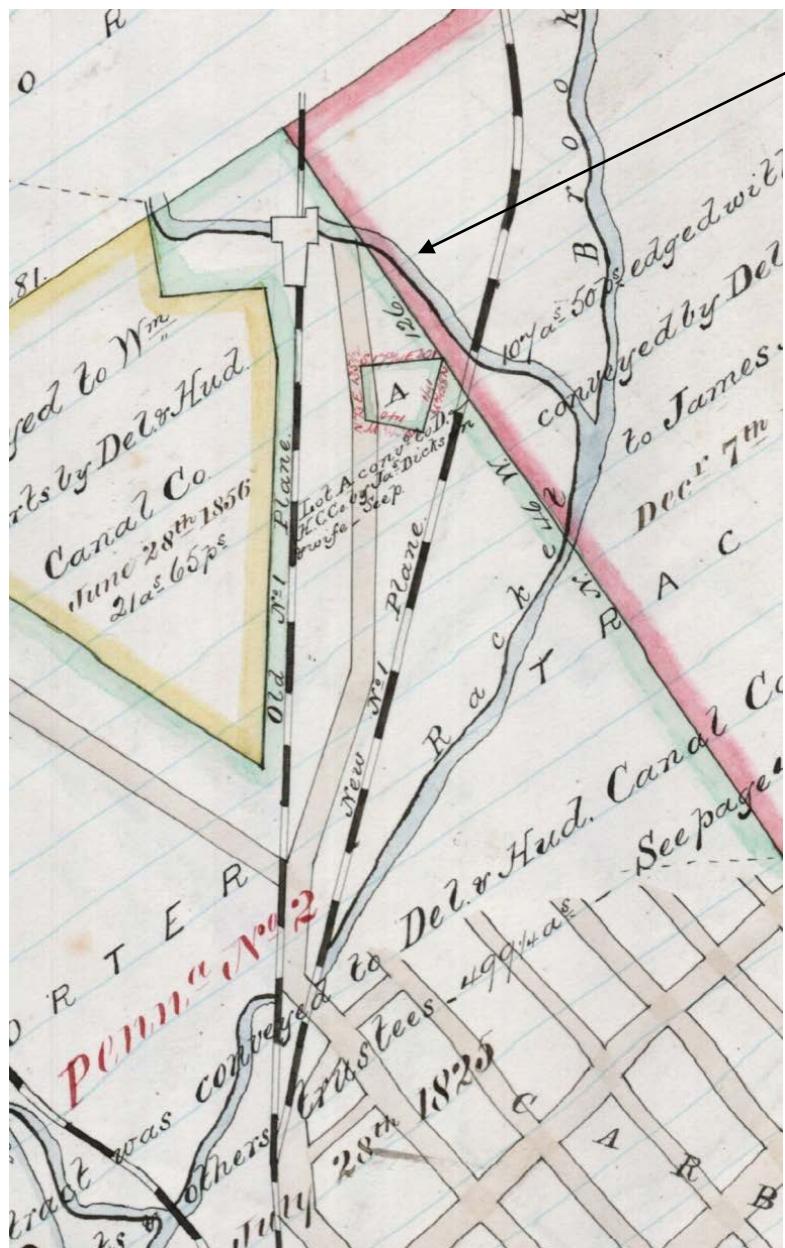
The canal that flowed through downtown Carbondale

The Parade encompassed the entire area now occupied by Memorial Park and City Hall/the Library.

Here is a closer look at the waterwheel and the plane from the mines:



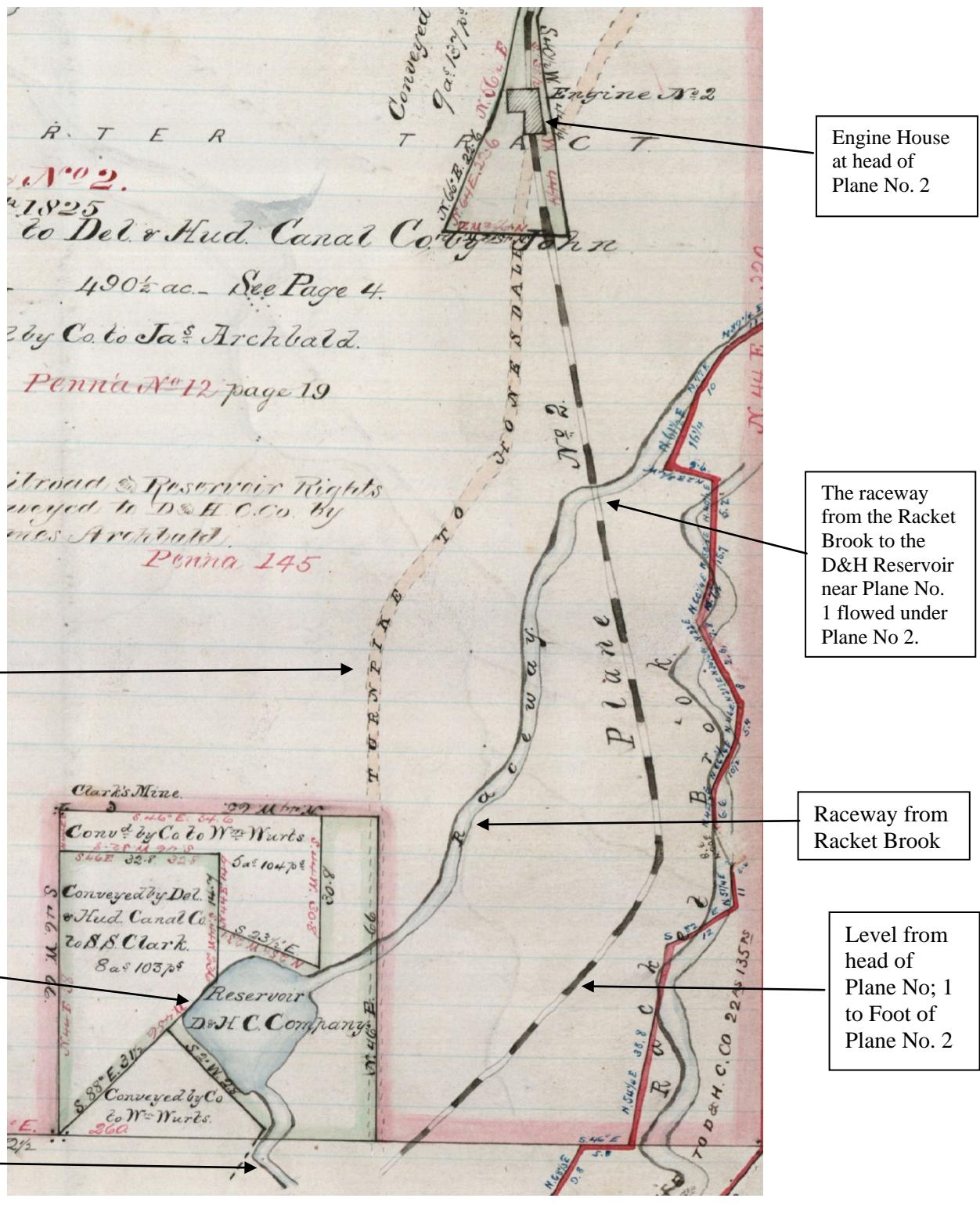
Here is a closer look at Plane No. 1. Note that in the detail below that "Old No. 1 Plane" went up the hill to the left of what is now called Canaan Street on a street now called Sage Court and Copeland Avenue. Note also the engine at the head of the plane, which was provided with water from the D&H reservoir that was located in the area where the former Carbondale city dump was at one time located. The excess water for the engine at the head of No. 1 flowed down the embankment to rejoin the Racket Brook (which provided the water for the reservoir in question).



From the engine house at No. 1, water flowed down the hill and back into the Racket Brook, from whence it came.

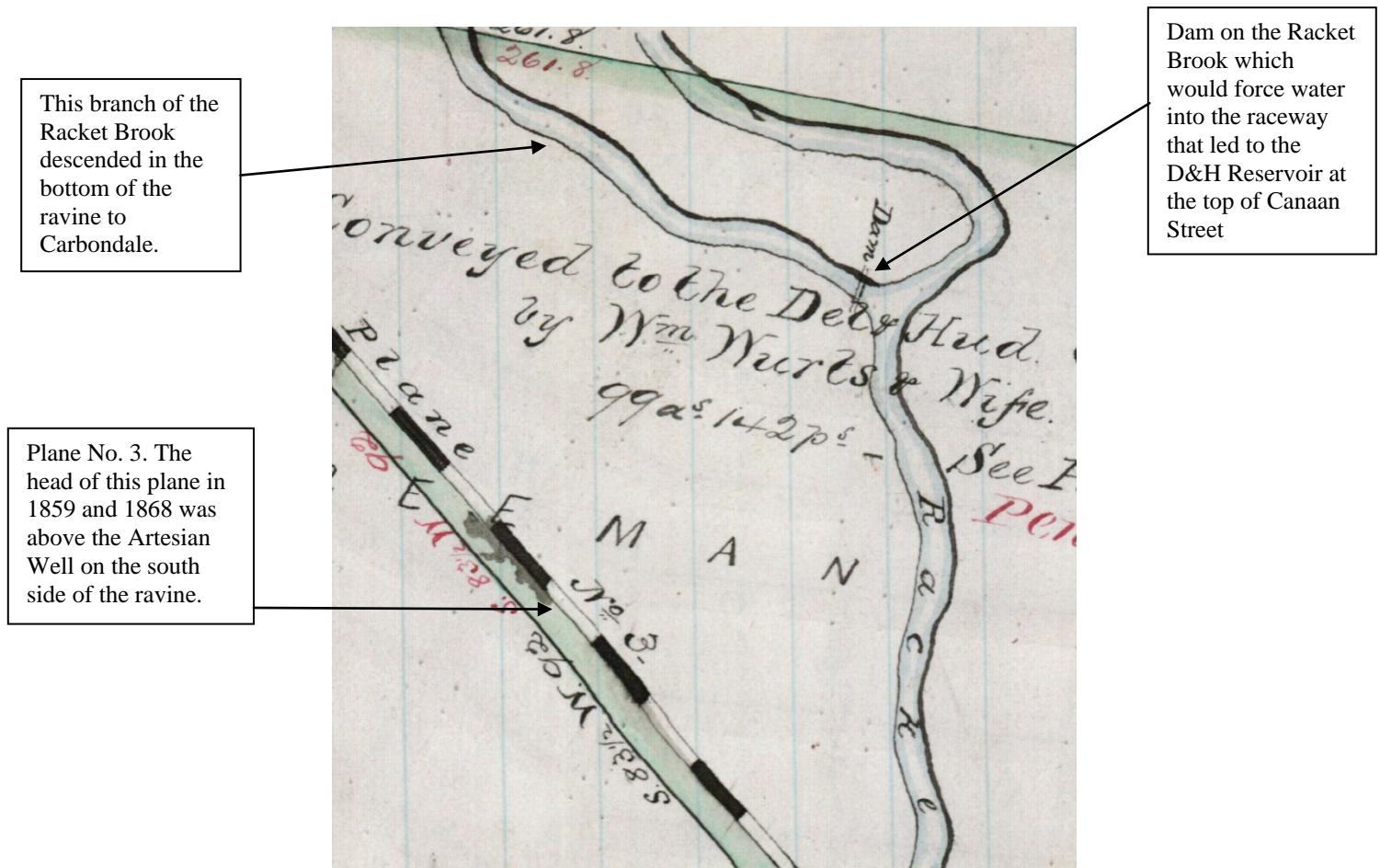
The water for the stationary steam engine at the head of Plane No. 1 was provided by the “Reservoir D&H C Company” that was located at the top of the hill to the north of the engine house. Note also that the excess water that flowed into the engine house flowed downgrade to re-join the Racket Brook at the bottom of the ravine. That reservoir is shown on the map detail, from the map on page 10 in the D&H book, given below.

Also shown on the detail given below is the level between the head of Plane No. 1 and the foot of Plane No. 2. “From the head of Plane No. 1 the track was nearly level for 600 feet to the foot of the next plane [Plane No. 2].” (Torrey, 1882)



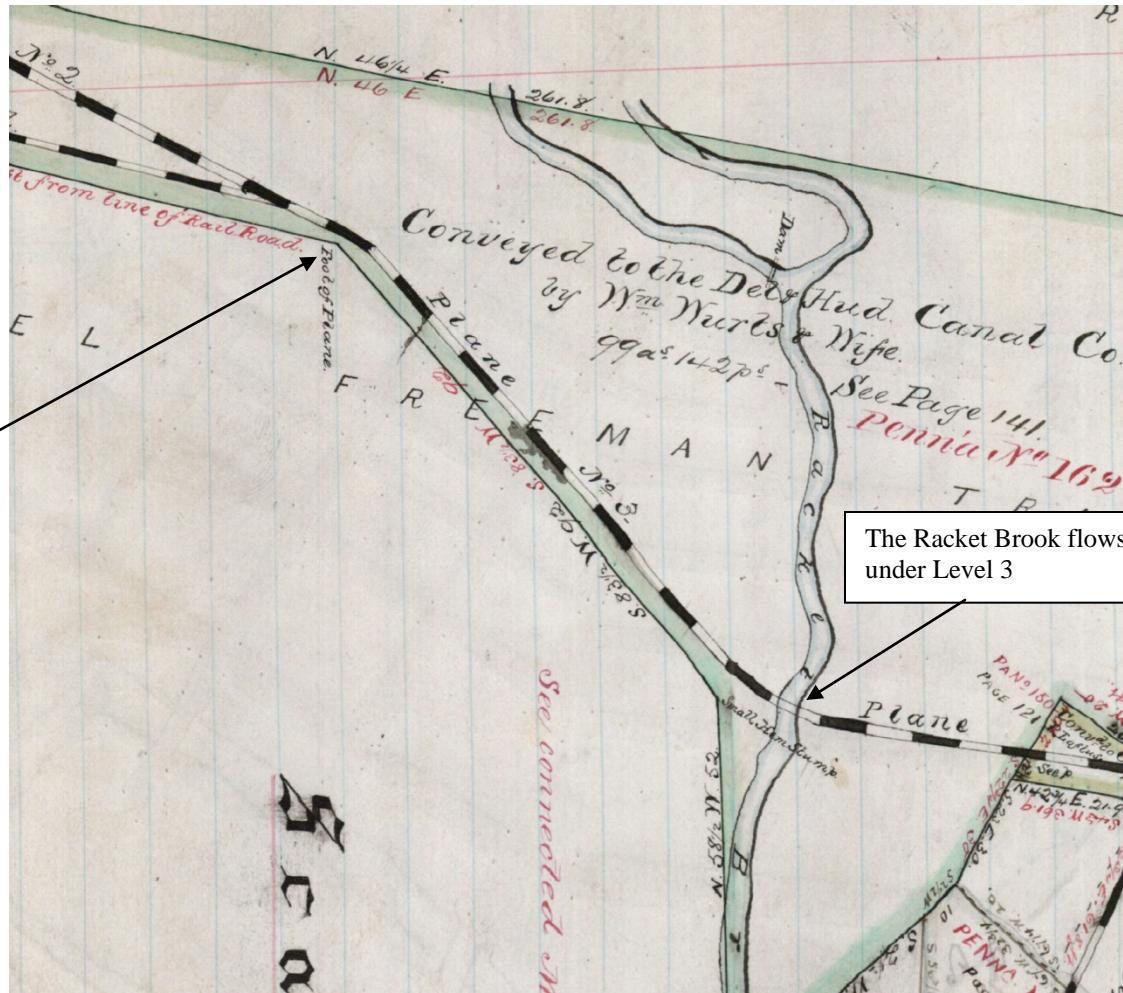
The water for this reservoir came from a raceway that was established as a branch of the Racket Brook. To move water into the raceway, the D&H built a dam across the Racket Brook in its flow down the mountain from No. 4 Pond (where the Racket Brook originates). Significantly, the Racket Brook was made to flow, not in the bottom of the ravine where it now flows (and where it would naturally flow), but up along the north side of the ravine where it was put to work by and for the D&H. First we will look at a close-up of the area (map in D&H book on p. 11), and then we will look at the larger view:

Close-up: Dam on Racket Brook in upper right corner:



Left to its own devices, the Racket Brook would not flow where it is shown to flow in the map below, along the north side of the ravine. Instead, it would “naturally” flow at the base of the ravine (where it now flows), which would place it about in the middle of Plane No. 3 in the

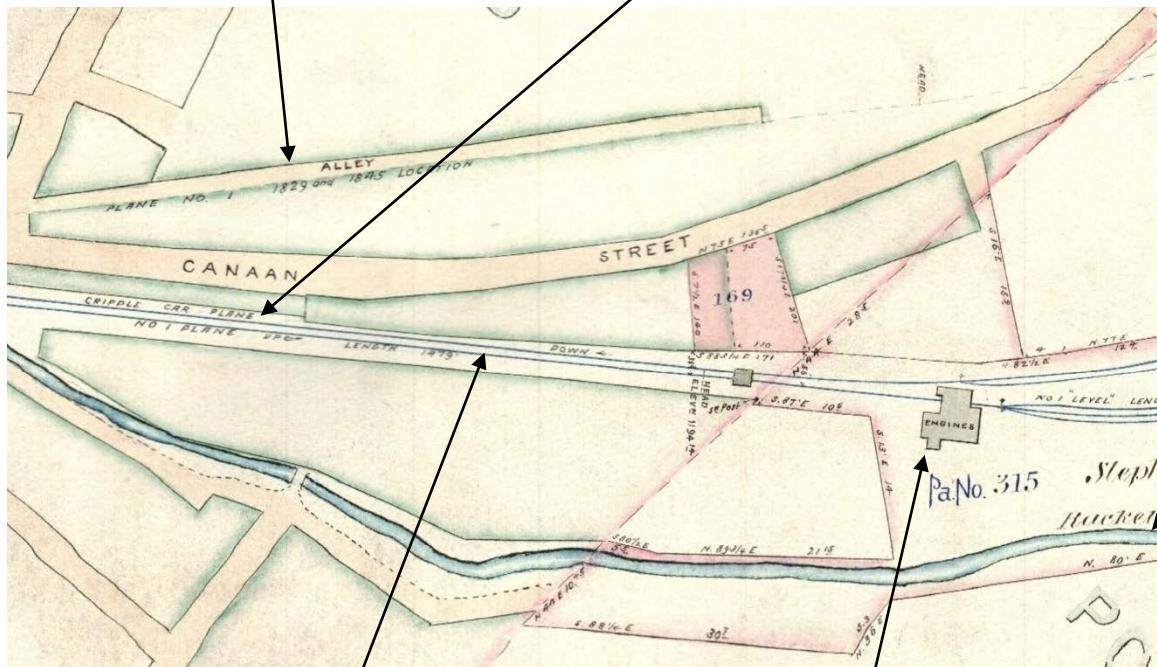
center of the view shown here, the water course running from top to bottom of the map shown here. Plane No. 3 as shown here dates from 1859, so the Racket Brook was up on the north side of the ravine until at least then. The section of Plane No. 3 as shown below, was on a trestle that spanned the ravine (present-day Artesian Well area). Beneath the trestle and on both sides of it was filled in and the masonry stone culvert that still stands on the site today was installed so that the Racket Brook could flow down the center of the ravine, where it would naturally flow, when left to its own devices.



Here is another view of "Old Plane No. 1," which went up the "alley" on the north side of present-day Canaan Street to the top of the hill in both the 1829 and 1843 configurations. In this view we also see Plane No. 1 in the 1859 and 1866 configurations. The view is from the 1895 Gravity Railroad map volume in the collection of the Lackawanna Historical Society:

Plane No. 1,
1829, 1845.
This alley is
now called
Sage Court.

Cripple Car Plane
(north plane on Plane
No. 1) in 1868
configuration



Loaded track
on Plane No. 1,
1868
configuration

Engine house at head of
Plane No. 1, 1859, 1868

Racket Brook
flowing down
into
Carbondale

In the article titled "The Celebrated Gravity Road" (in Gritman scrapbook, dated there "Monday, February 17, 1902") we read: "About the same time [circa 1858] the road was changed to the present [end of 19th century] No. 1 plane from a place a little north of it [north of Canaan Street, i.e., in the direction of Simpson]."

Plane No. 2

--35 horsepower engine at the head of the plane

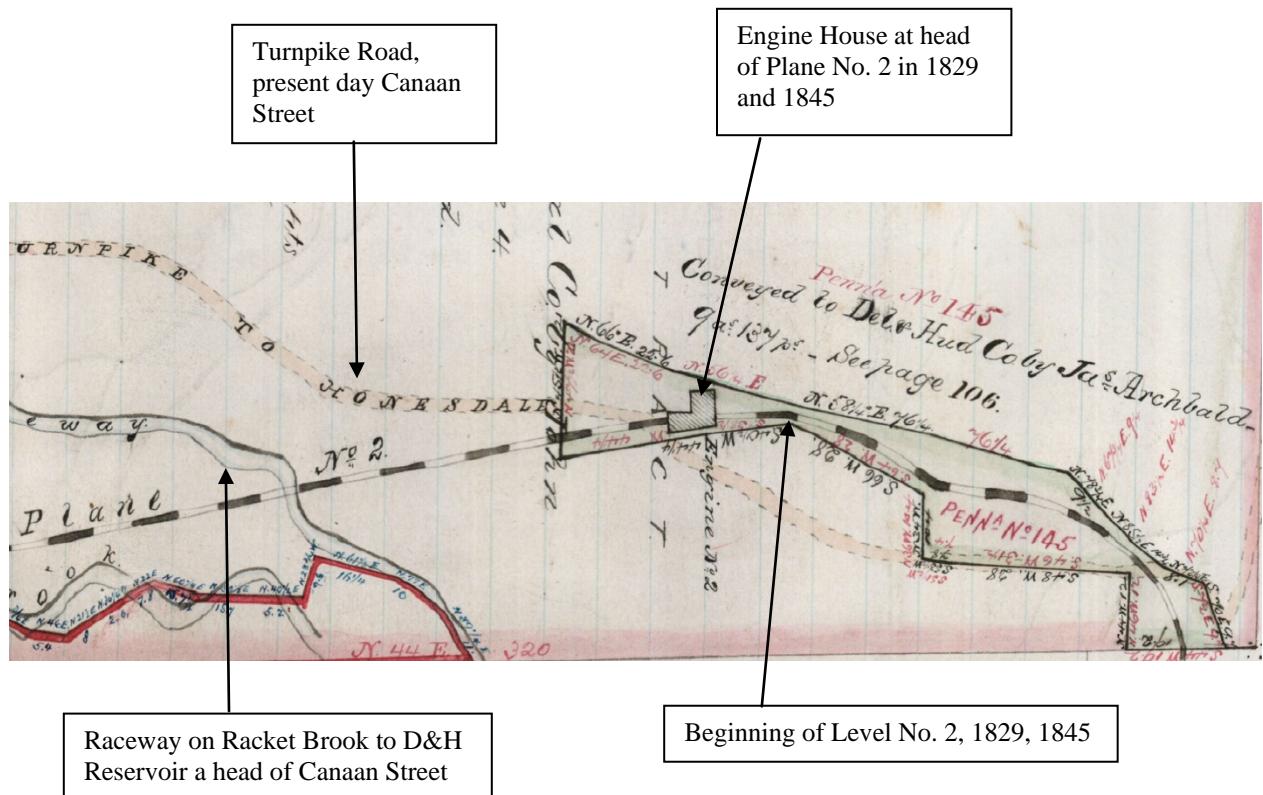
Engineers at the head of Plane No. 2:

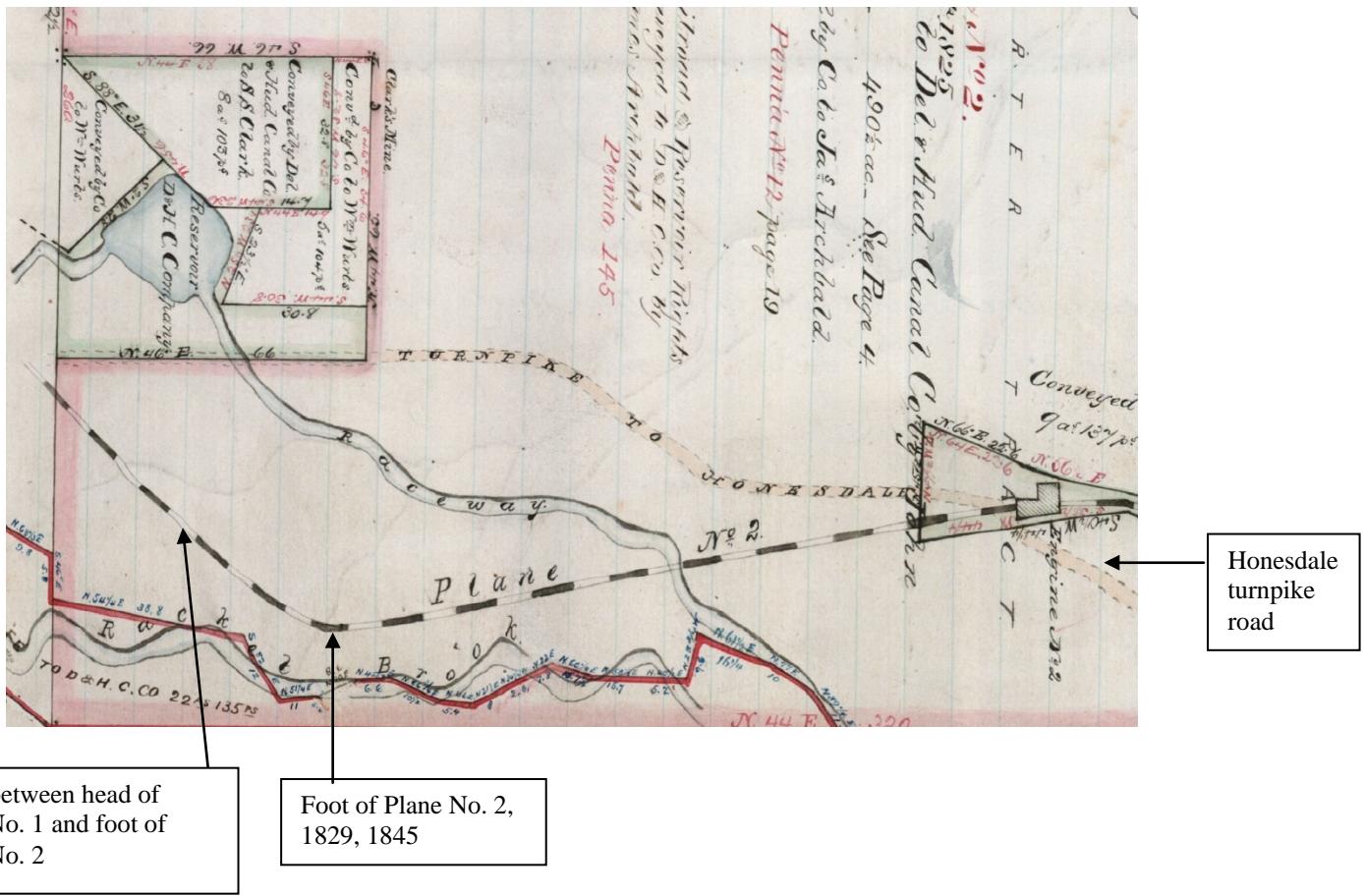
"At No. 2, the engineers were in the following order: Thomas Pillow, James Johnson, brother of Mrs. Davis on River street, Patrick Archbald, Perry R. Farrer and James Campbell, who had been in service there from 1858 to 1897, when he resigned and John Bate was appointed in his place." (*Joslin/Davies*)

The level from the head of Plane No. 1 to the foot of Plane No. 2 was 600 feet long, and nearly level.

"Plane No. 2 was 2600 feet long, ascending 130 feet (or 1 foot in 20). This also was parallel to and along the western side of the turnpike." (*Torrey, 1882*)

The engine house at the head of Plane No. 2, both in 1829 and in 1845, was right at the western side of the Turnpike to Honesdale. This engine house is shown on the map in *D&H Deeds Luzerne I*, p. 10, deed dated July 28, 1825, given on pages 1-6, between John Wurtz & others, Trustees, and The Delaware & Hudson Canal Company. The level between the head of Plane No. 2 and the foot of Plane No. 3, both in 1829 and in 1845, stayed on the western side of the turnpike road until it reached the White's Crossing area, where it then crossed the turnpike on its descent to the foot of Plane No. 3. Here are two details from that map:





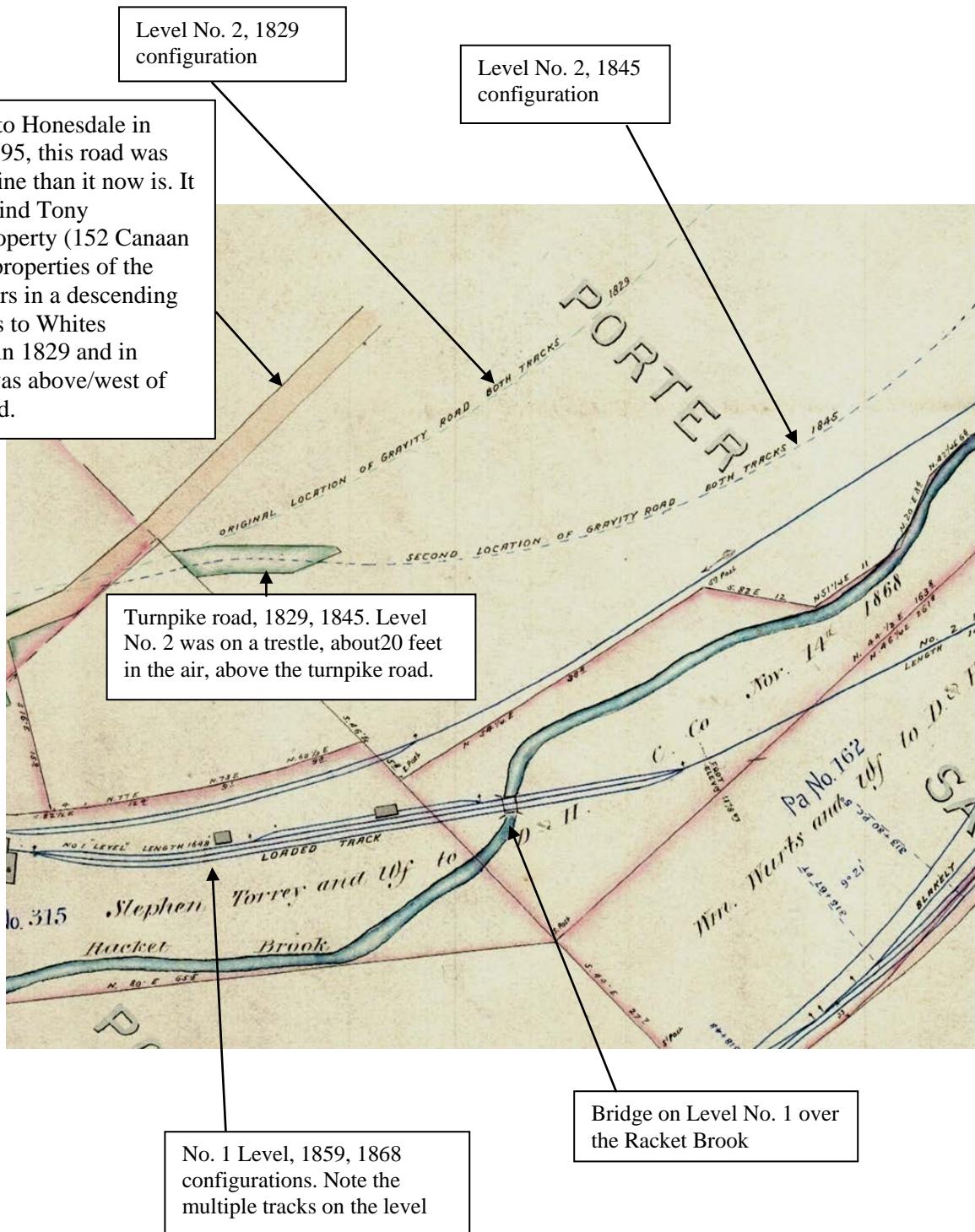
“From the head of No. 2 [in the 1829 configuration], the track [Level No. 2] was nearly level 2,600 feet [over 800 yards]. This level part of the track crossed the turnpike, reaching the foot of plane No. 3, on the southeast side of the turnpike, at the foot of the hill called ‘No. 3 Hill,’ about one and one-half miles from the foot of No. 1.” (Torrey, 1882)

The Level between the Head of No. 2 and the Foot of No. 3:

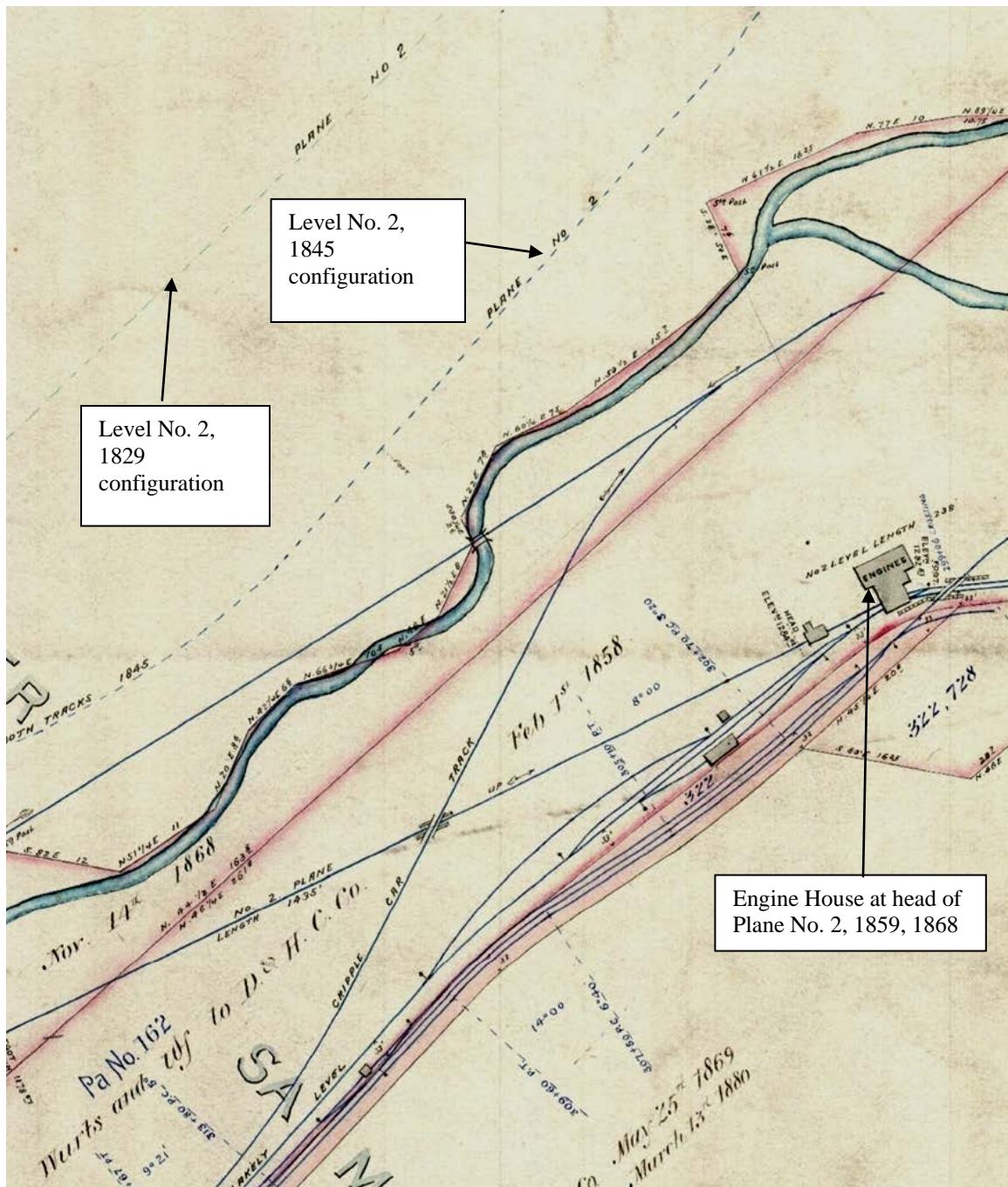
In Joslin/Davies we read: “Between the head of No. 2 and foot of No. 3 was a long space where cars were drawn by horses. Part of this track was a trestle about twenty feet above the road below. [emphasis added] A driver boy who lived only a few rods from the road, used a board for a seat to sit on, which was very light, instead of a heavy one his parents had provided for him. As the cars came opposite his home, his mother stood in the door looking at him, when his seat broke, throwing him under the loaded cars, which killed him instantly.”

In 1845, Level No. 2 (over 800 yards long, between the head of 2 and the foot of 3) followed a different path than this level in 1829.

The location of Level No. 2 both in 1829 and 1845 are shown on the detail from the 1895 Gravity Railroad map volume given below.

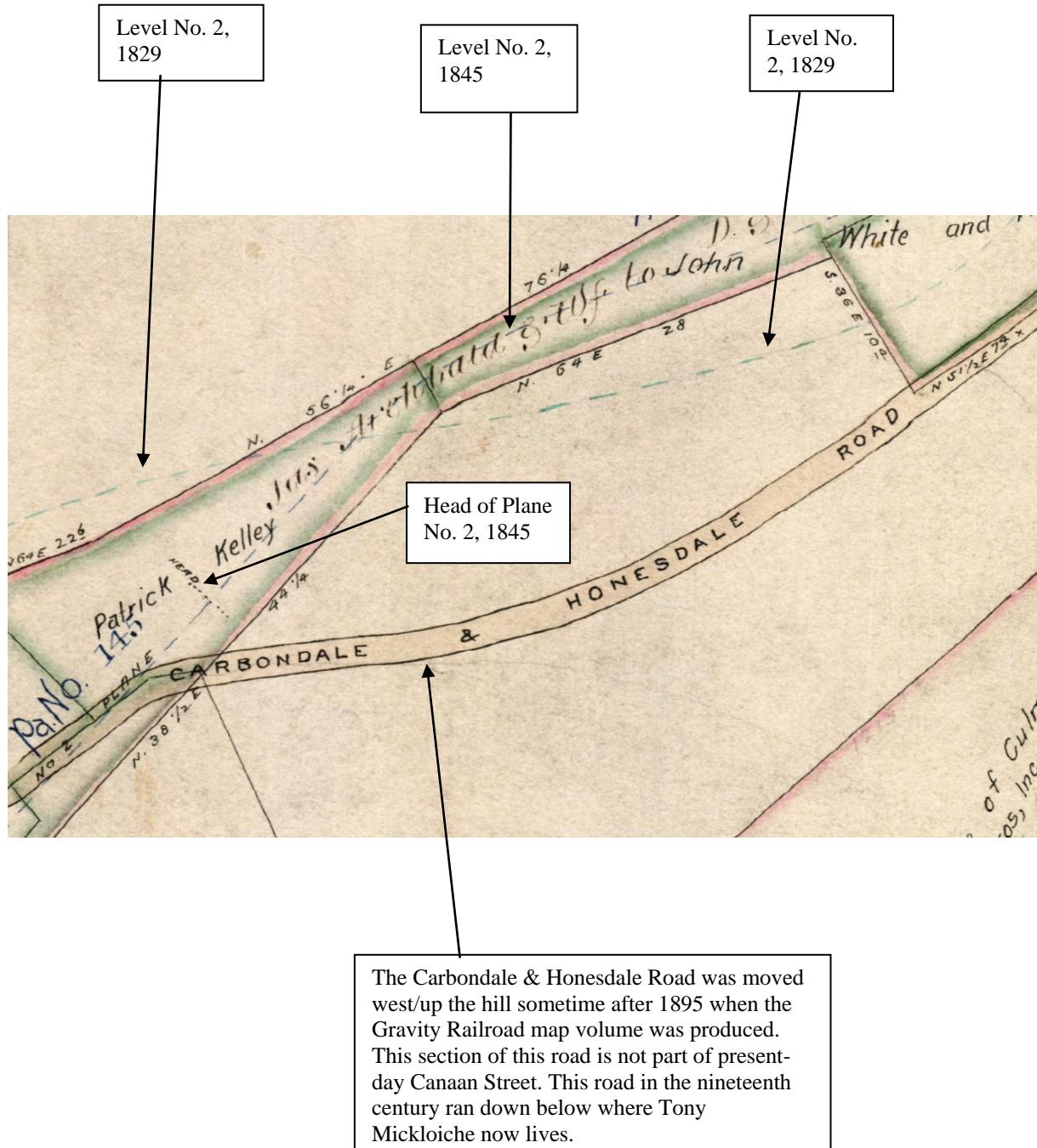


A second look at this area:



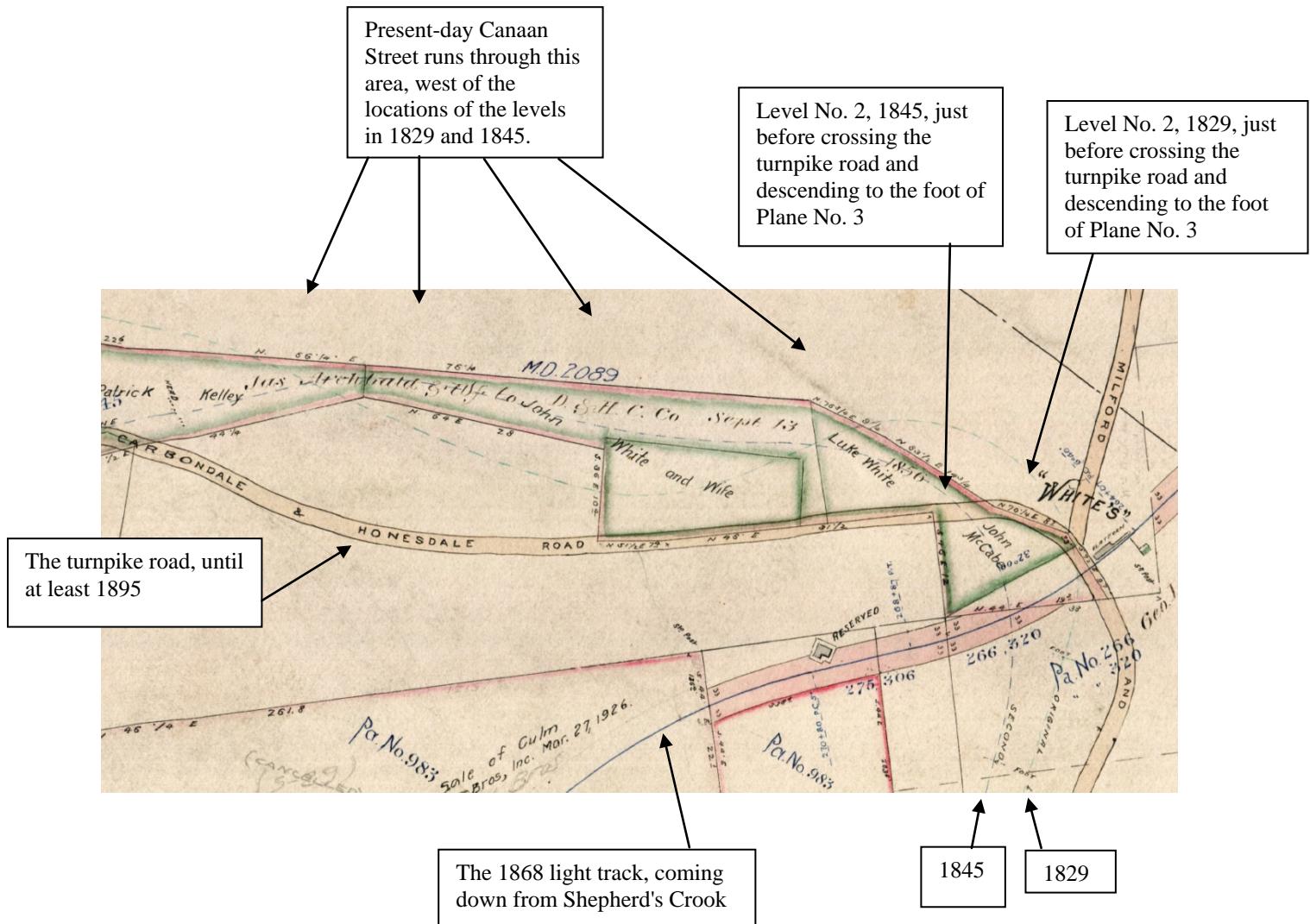
Level No. 2 (1829, 1845), as shown in the 1895 Gravity Railroad map volume:

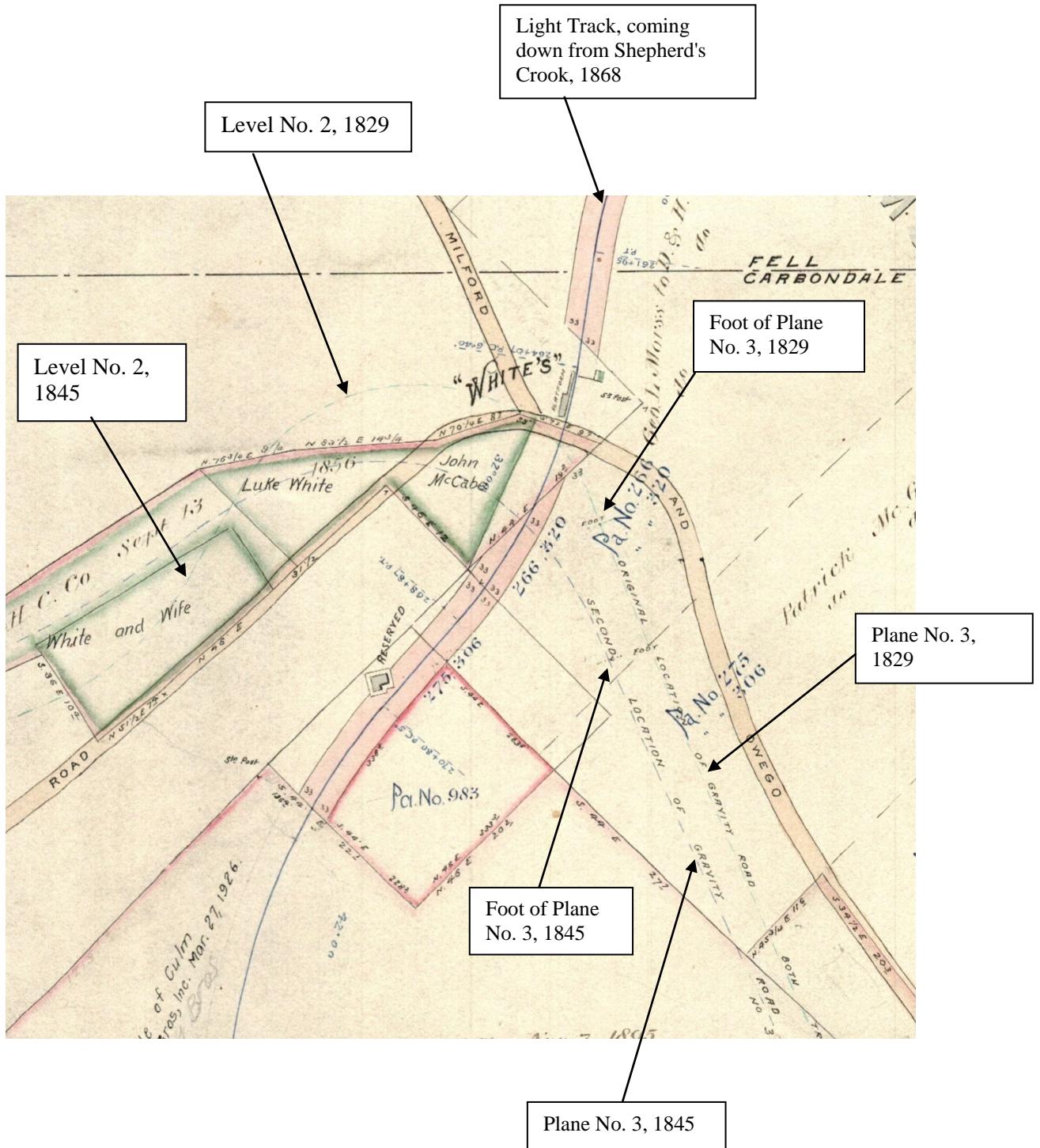
Detail No. 1:



Level No.2, 1829, 1845, Gravity Railroad map volume:

Detail No. 2:





Level No. 2 in 1829: "This level [2,600 feet long, between head of No. 2 and base of No. 3] part of the track crossed the turnpike, reaching the foot of plane No. 3, on the southeast side of the turnpike, at the foot of the hill called 'No. 3 hill,' about one and one-half miles from the foot of No. 1. / Plane No. 3 was 2550 feet long, ascending 210 feet, (or 1 foot in 12,) then the track was nearly level [Level No. 3] 400 feet to the foot of plane No. 4, which was 1,800 feet long and ascended 150 feet, (or 1 foot in 12). (*Torrey, 1882*)

2938

The Stable between Nos. 2 and 3

"One of the well known figures on the gravity, while horses were used, was Elias Thomas. The company had a stable between Nos. 2 and 3, where the horses used on the several levels were kept. Mr. Ball used to say that Thomas was as good as a barometer. As he passed over the line he would say to Thomas, "What kind of weather are we going to have?" His answer would be, 'Fair, the salt is dry' or 'rain, the salt is moist.' Salt was supplied him by the barrel, for the use of the horses, and if it was dry even though a storm had not cleared up, the salt would indicate a clearing up by its being dry and while it was still fair an approaching storm was indicated by the moisture of the salt." (*Joslin/Davies*)

More on Elias Thomas:

"Resigned. / Mr. Elias Thomas, for many years one of the mining bosses of the D. & H. C. Co. in this city, has resigned his position, for the purpose of giving his whole attention to the coal business in which he has engaged with Mr. Hendrick. They run the first coal through their Breaker on Thursday." (*Carbondale Advance, January 4, 1873, p. 3*)

2939

Plane No. 3

--35 horsepower engine at the head of the plane

The foot of Plane No. 3, both in 1829 and in 1845, was in the gully at White's Crossing, the 1845 foot being a little farther into the gully (farther up the hill) than the 1829 foot. This can be seen, faint blue dotted lines, in the detail from the 1895 map given immediately above.

"Plane No. 3 was 2550 feet long, ascending 210 feet (or 1 foot in 12), then the track was nearly level 400 feet to the foot of plane No. 4, which was 1,800 feet long and ascended 150 feet, (or 1 foot in 12)." (*Torrey, 1882*)

Engineers at the head of Plane No. 3:

"No. 3 was manned first by Benjamin Franklin, followed in order by Edward Davis, John C. Davis, E. Y. Davis, Antoine Delafontaine. E. Y. Davis was transferred to No. 28. P. J. Foster succeeded Delafontaine, transferred from No. 7. E. Y. Davis said there were two engineers of the name of John C. Davis, and for that reason his father omitted the C. in his name, yet in the records one not knowing where they were stationed can not tell which one was meant in speaking of them." (*Joslin/Davies*)

Reward offered for names of those who destroyed John Davies' orchard:

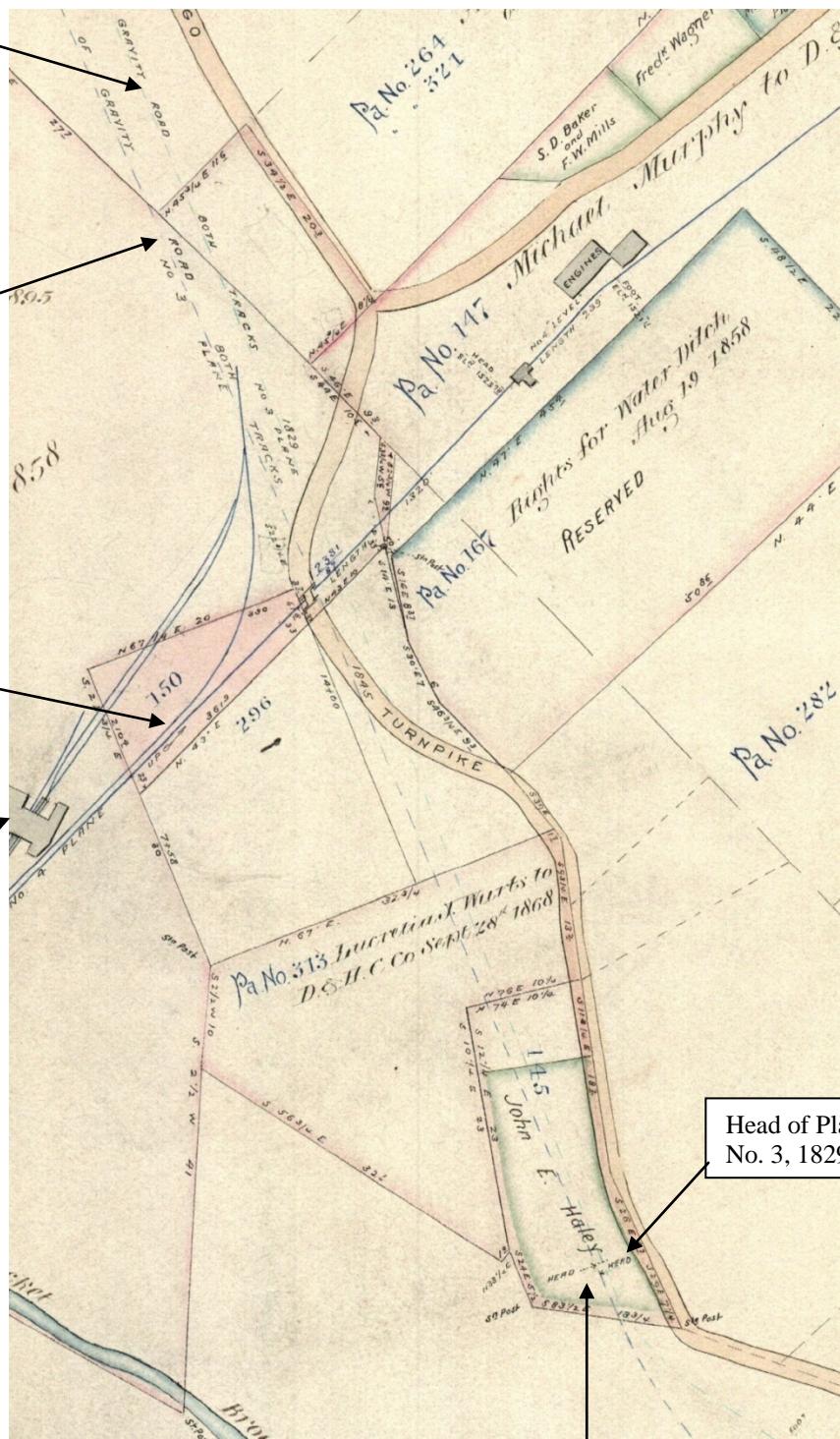
"**\$25 Reward! ! !** / The Subscriber offers the above reward to any one for information against the person or persons who destroyed his young orchard, some evenings since, provided such communication shall be sufficient to convict the depredator, or depredators at a proper tribunal, and render him or them liable to the penalty of the laws. / **John Davies.** / Rail road, No. 3 / Carbondale, March 28." (Ad in *Northern Pennsylvanian*, Friday, April 11, 1834, p. 4)

John Davies' house destroyed by fire:

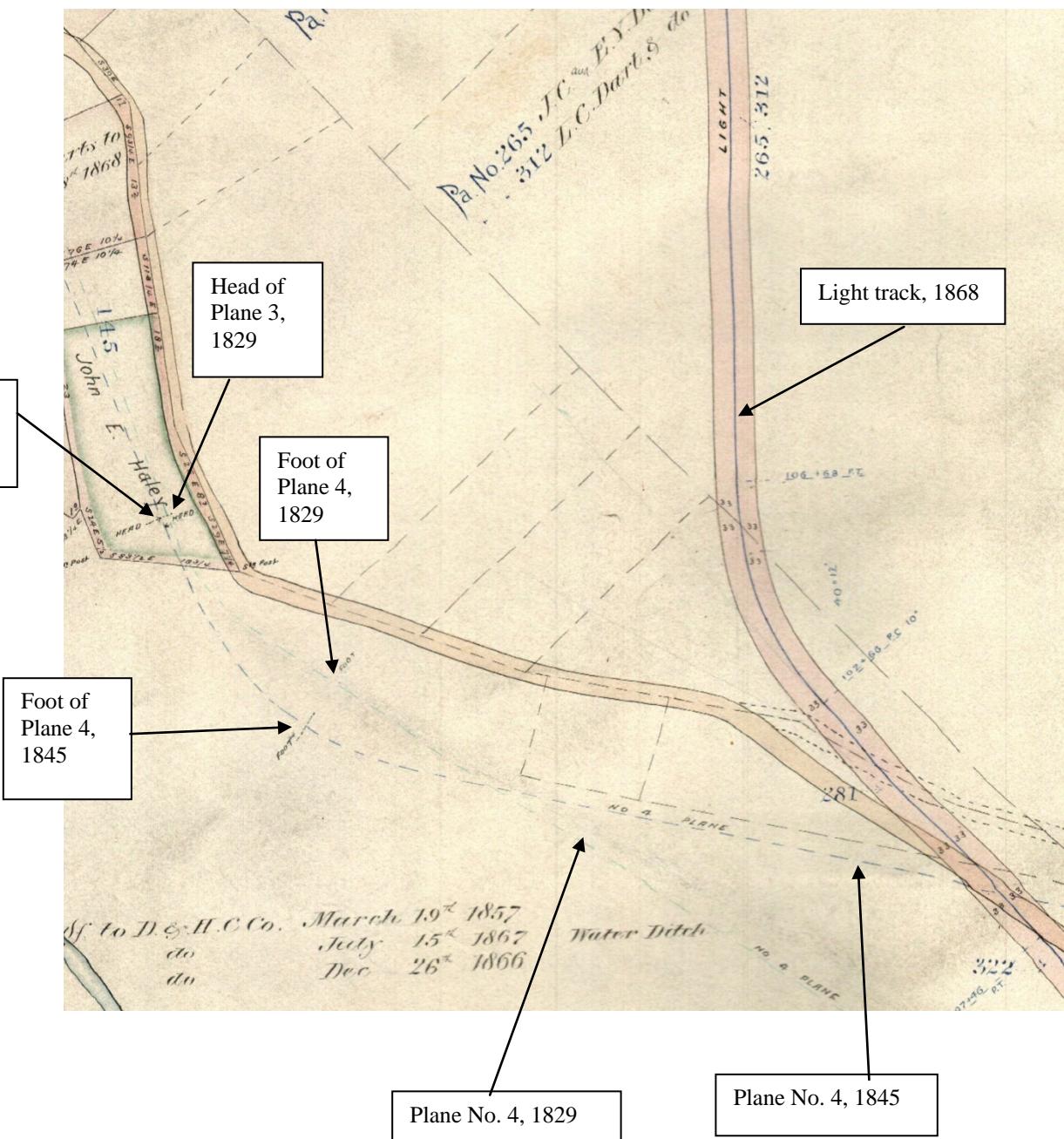
"CASUALTY.—On Saturday evening last, at No. 3, Rail Road, Carbondale, the House in which Mr. John Davies resided, took fire and was consumed, together with most of the property belonging to him and his family." (*Northern Pennsylvanian*, May 30, 1834, p. 3)

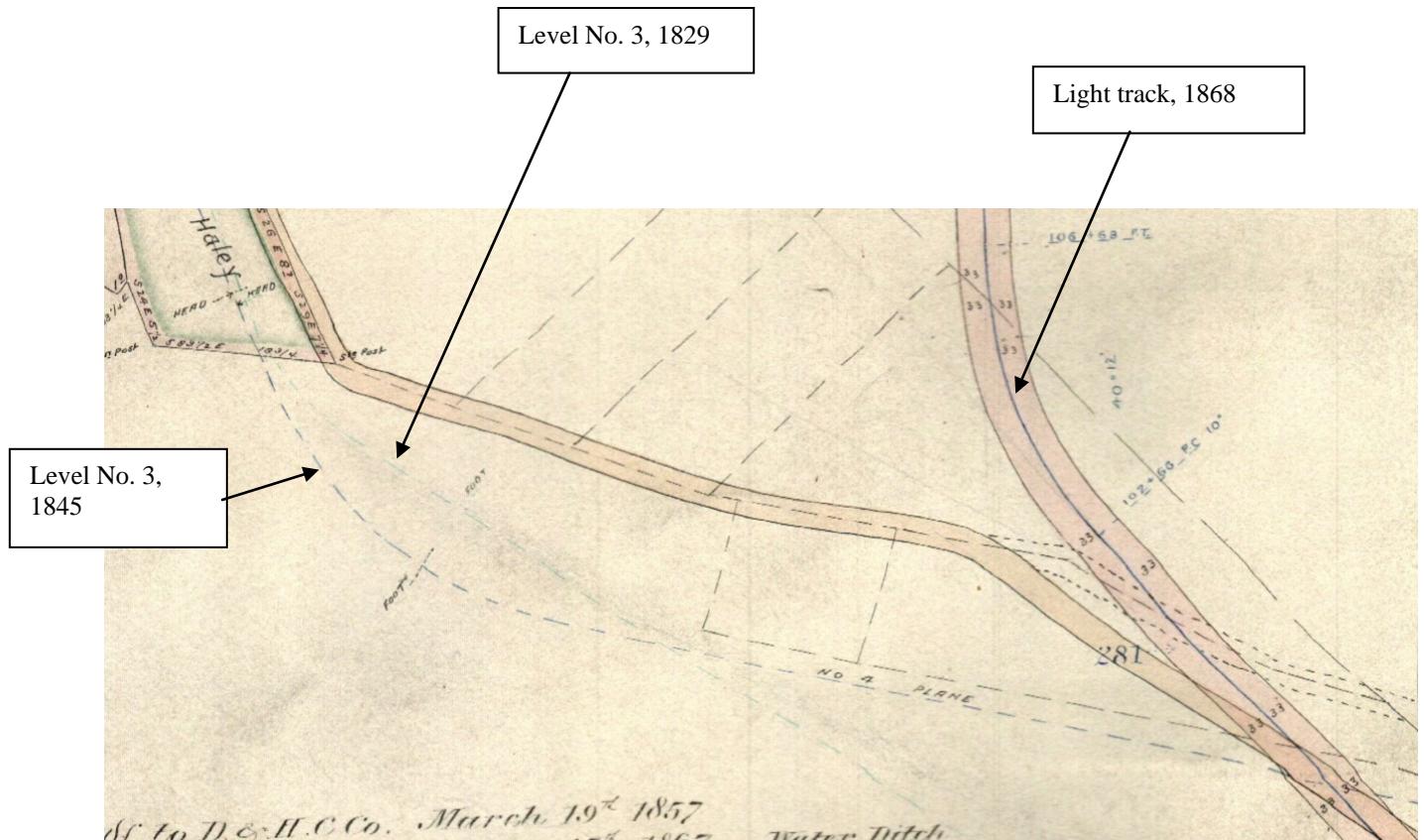
Both in 1829 and in 1845, Plane No. 3 went up the hill wholly to the south of the Owego Turnpike for the first portion of its journey. The 1829 plane was slightly to the west (going uphill, to the left) of the 1843 plane's location. About mid-way up the hill, the Plane (both in 1829 and in 1843) went on the Owego Turnpike roadway for a short period and then continued on upward, close to the Owego Turnpike, but remaining to the south of it, which can be seen in the map detail given below:

Plane No. 3,
1829



The head of Plane No. 3, both in 1829 and in 1845, is shown on the two details (the second is a close up) given below from the 1895 Gravity Railroad map. Note that in both configurations, the heads (marked on the map just under the word "Haley") are just about opposite each other.





At this point, two entirely separate paths (one for the 1829 roadbed, one for the 1843 roadbed) for Plane No. 4 were established.

Just east of the foot of No. 4 Plane in 1829 and the foot of Plane No. 4 in 1843, the paths of the planes cross, with the 1843 Plane No. 4 going up the incline to the left of present-day No. 4 Pond and around to the back of the pond, crossing a section of the reservoir and then going on up the hill, and with the 1829 Plane No. 4 ascending the incline to the right of No. 4 Pond (the Route 6 side) to the head of Plane No. 4 there, and then on to Plane 5 to the top of the mountain (both No. 4 and No. 5 in 1829 on the Route 6 side of No. 4 Pond).

Plane No. 4

--25 horsepower engine at the head of the plane

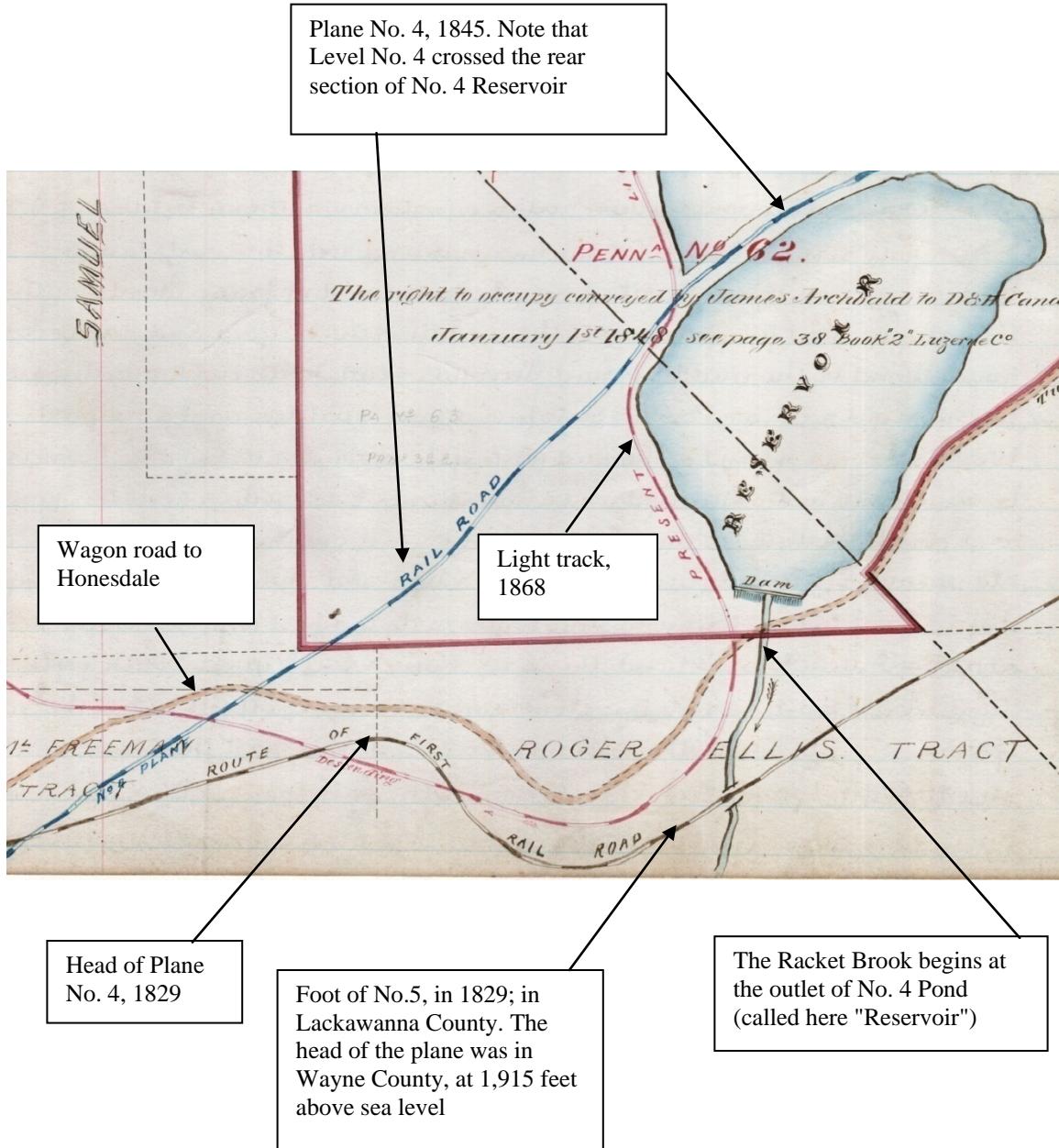
Plane No. 3 was 2550 feet long, ascending 210 feet, (or 1 foot in 12,) then the track was nearly level [Level No. 3] 400 feet to the foot of plane No. 4, which was 1,800 feet long, and ascended 150 feet, (or 1 foot in 12). / From the head of No. 4 the track was nearly level 2,000 feet to the foot of No. 5, near Racket Brook, some fifty rods [1 rod = 16 ½ feet or 5 ½ yards] below the Company's reservoir dam. Planes 3 and 4, and the level between 4 and 5, were located along the south eastern side of the turnpike, and as nearly parallel thereto as the meanderings of the turnpike would admit of." (Torrey, 1882)

Engineers at the head of the plane:

"No. 4, John C. Davis came from New York with others of the first engineers to put up the engines, and was given the position as engineer, followed by Peter Campbell; Patrick Archbald, Charles Ball, who was killed June 7, 1845, while working about the engine, and Patrick Grattan, who was on the new road was transferred to No. 5." (Joslin/Davies)

For the construction of the dam at No. 4 pond, see page 210 of the volume on the 1868 configuration of the Gravity Railroad.

The "Route of First Rail Road," the 1829 configuration, in the Number 4 Pond area is shown on the map below in black ink. Planes 4 and 5 were in this section, both on the highway side of Number 4 Pond/Reservoir (which was named Number 4 because it supplied water to the engine at Plane No. 4). (The roadbeds in blue on this map are of the 1843 configuration; those in red of the 1866 configuration.) This map illustrates the release, dated August 11, 1856, between Henry Edgett / Horatio N. Edgett and The Delaware and Hudson Canal Company. That release is given on page 274 of D&H Deeds PA; the map on page 275. Here is the relevant section of that map:



Plane No. 5

--35 horsepower engine at the head of the plane

"From the head of No. 4 the track was nearly level 2,000 feet to the foot of No. 5, near Racket brook [which flows out of No. 4 Pond], some fifty rods below the Company's reservoir dam. Planes 3 and 4, and the level between 4 and 5, were located along the south eastern side of the turnpike, and as nearly parallel thereto as the meanderings of the turnpike would admit of. / Plane No. 5 was 2,500 feet long, ascending 208 feet to a point on the mountain about a half a mile from the turnpike, and within Wayne county. The head of this plane was the highest point reached, 1915 feet above tide, and 945 above the canal in Honesdale.' (Torrey, 1882)

Engineers at the head of Plane No. 5:

"No. 5, whether in the order here given, [the engineers at the head of the plane] were Ned Farrell, John C. Davis, J. B. Smith, Orlando Foster, William Miller, Adam Hunter, who died after running the engine from 1876 to 1887, Samuel T. Chubb. Some accounts give John C. Davis as the first engineer at No. 5, and that was the engine he helped to erect." (Joslin/Davies)

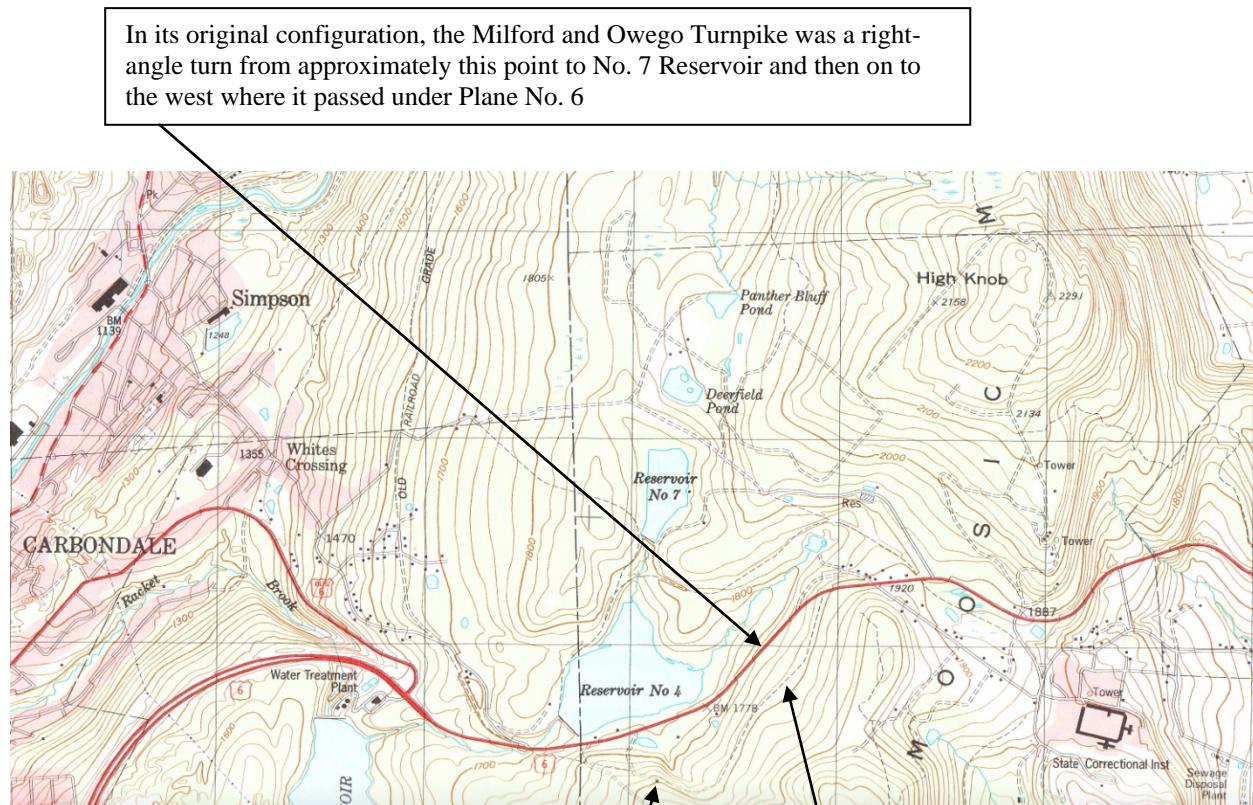
In an undated newspaper article titled "The Celebrated Gravity Road" (probably published in the *Carbondale Leader* in the 1890s) in the archives of the Historical Society, the author reports the following fact about the Gravity roadbed in the vicinity of Planes 4 and 5 when the line opened in 1829: "The first tracks were not located as they are now. Many changes have been made to secure better advantages for the action of gravity. The first loaded track [1829 Configuration] ran far to the south of No. 4 pond. A second track [1843 Configuration] ran across the Northern end of No. 4 on stone piers. The third track [1858 Configuration] was where it is now." [i.e., where it was put in 1858 and where it remained until the end of the 19th century.

"The first road had five planes to the summit, the fifth one being located south of No. 4 reservoir." See "Engines with a History" under Plane 22, Extension to Valley Junction.

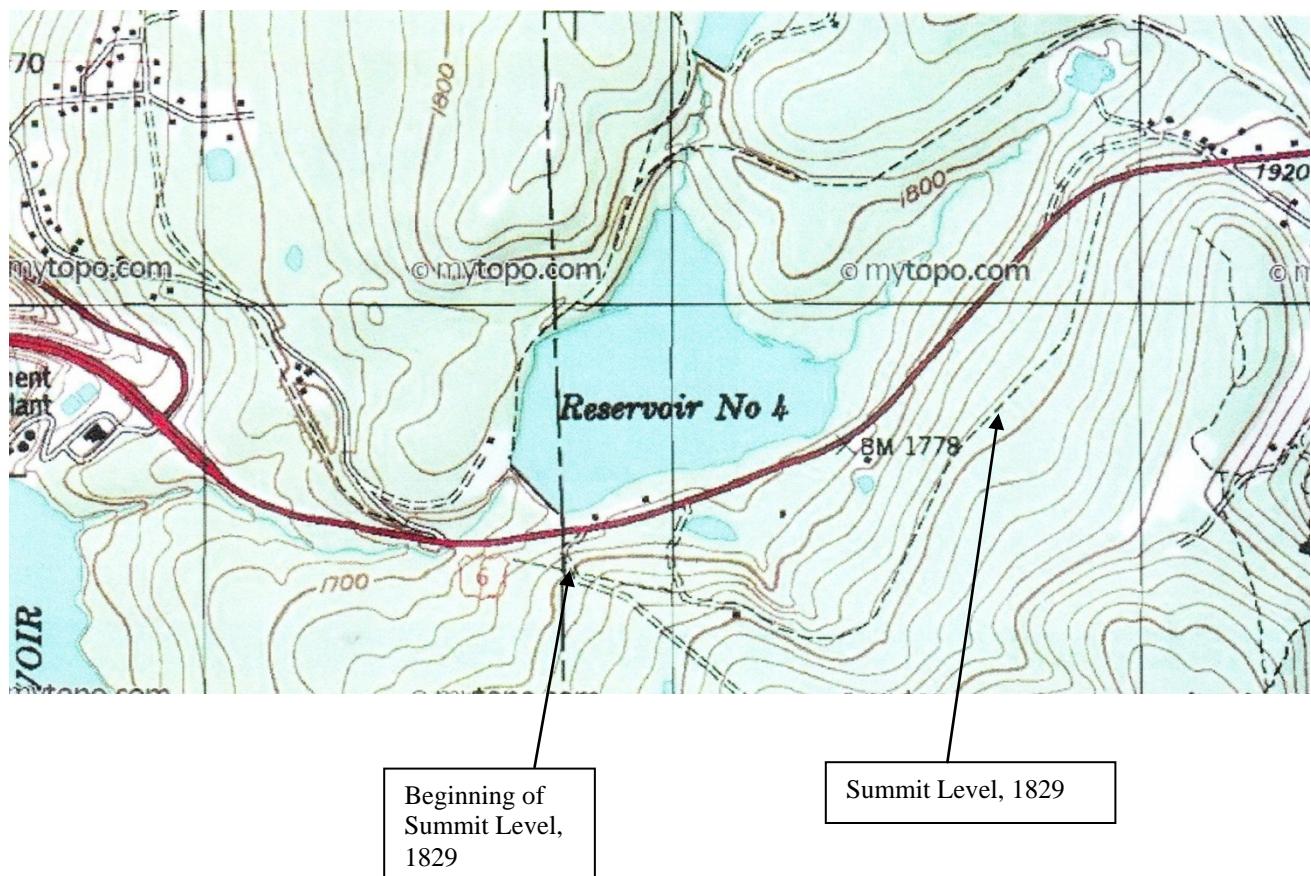
"Any one of the five ascending planes, said the D&H, will pass seven and one-half tons of coal one-half a mile in eight minutes." *COP*, p. 67

Plane No. 5, Level No. 5 (Summit Level), 1829:

USGS topographical map of Waymart, PA, 1999:



Another detail, from closer in, of this same area, showing the 1829 Summit Level:



Plans were also drawn up by William J. McAlpin (see the note here under Six-mile Level) for a rollway at the heads of Planes 5 and 6. These rollways were switching configurations: a car could be run onto a rollway, which could then be pushed sideways to line up with an adjoining track. Were these roll-ways ever built? Not sure. The 1829 configuration was single-tracked with passing turn-outs in the middle of the planes. Here is McAlpin's plan for the roll-ways at the heads of Planes No. 5 and 6 in the 1829 configuration:

First
Plan of Roll-way-Pay for Head of
Planes Nos 5 and 6

The joint or end of Roll-way at A for Plane No 5 to
be $6\frac{1}{4}$ feet from Center of sheave wheel and the same
joint for Roll-way at Plane No 6 to be $10\frac{1}{4}$ feet from
Center of sheave wheel. The 2^d Roll-way must cross the
3 roads but only requires a single way.

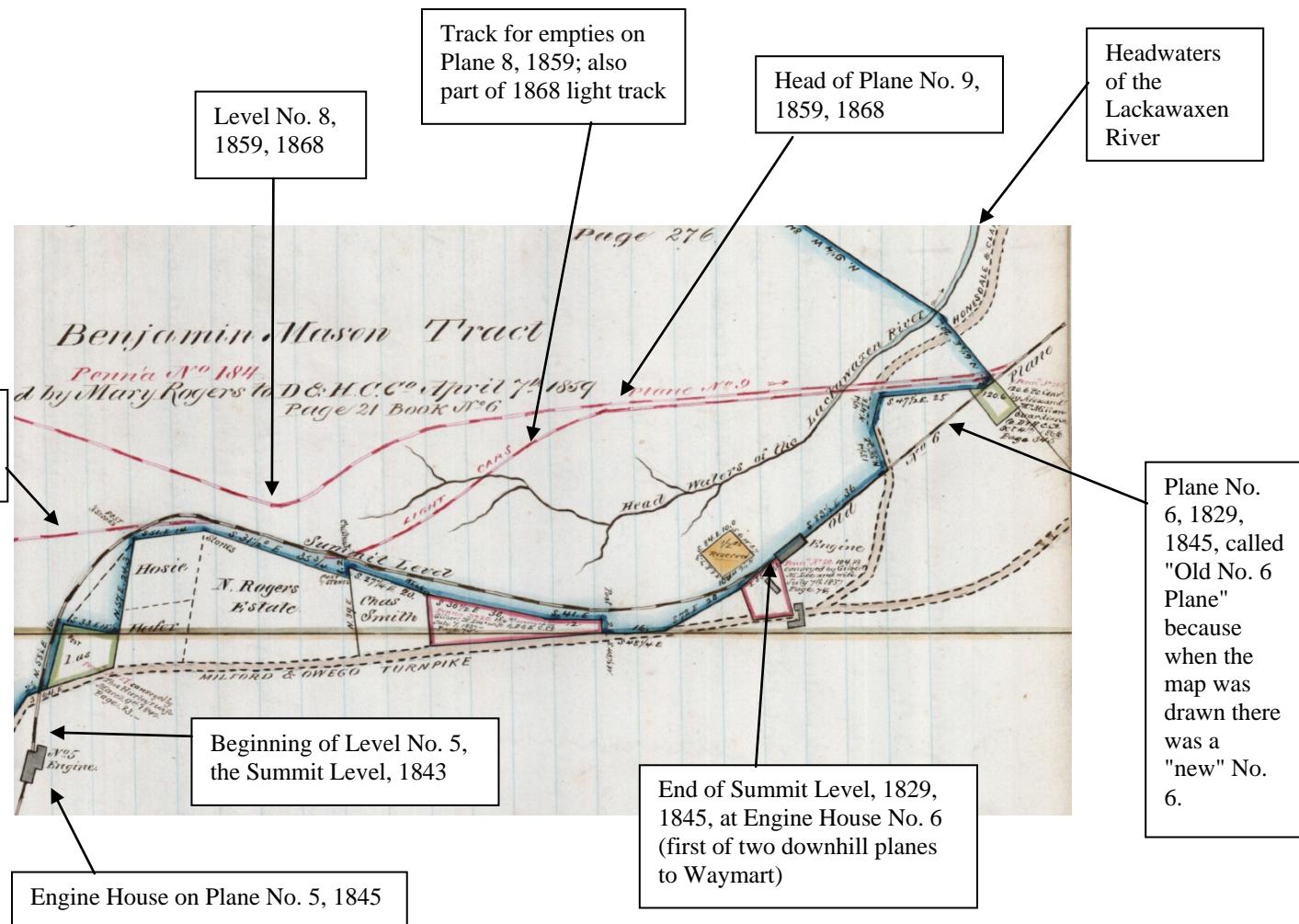
General Remarks It is not necessary that
the permanent supports of the road be placed so far as repre-
sented in the plan for the Roll-way joints, except the
support for the road is connected with the machinery: but
may better be placed so as to allow the rail timber to project
from 3 to 6 inches by its supports.

These plans were unsigned but
it is possible that they were
prepared by Wm P. Mc Alpin
about 1830 for J. B. Jervis.

The Summit Level, 1829, 1845

Map on page 280 in D&H Deeds PA that illustrates the deed, pp. 276-279, dated March 31, 1857, between Lucy Rogers et al. and The Delaware and Hudson Canal Company. Given below is a detail from that map. (The roadbeds in red on this detail are portions of the 1859 and 1866 roadbeds and will be discussed in later sections of the present work.) At the eastern end of the Summit Level was Engine House No. 6. In 1829 and in 1843, Plane No. 6 was the first of the two downhill planes from Farview to Waymart.

The level from the head of Plane No. 5 (1829, 1845) to the head of Plane No. 6 (1829, 1845) was also known as the Summit Level. But the location and length of the Summit Level in both of those years was different because Planes No. 4 and 5 were in different locations in both of those years.



The summit level in 1829: The summit level in 1829 (9,250 feet long , or one and three-fourths miles long) began back by No. 4 Reservoir and ran to the foot of No. 6, which is shown on the above map. The 1845 summit level (which was much shorter than the 1829 summit level) was, in effect, the final section the 1829 summit level.

The summit level in 1845: shown on the above map.

Duncan Lindley drowns in Reservoir No. 4:

"Fatal Accident./ On Sunday last, a foreigner from Scotland at No. 5, Rail Road, about 3 or 4 miles above this village, by the name of Duncan Lindley was bathing in the Reservoir [No. 4 Pond] near that place, through some unknown cause, (supposed to be occasioned by the cramp) struggled for a short time, and sunk before relief could be rendered, and was drowned." (*Northern Pennsylvanian*, July 11, 1834, p. 3)

Much damage caused by accident on Plane No. 5:

"ACCIDENT.--We learn that an accident occurred on the Railroad, about five miles from this place on Monday last. It appears that while drawing up a train of some five or six cars, loaded with Coal, on Plane No. 6 [Plane 6 in 1839 was a down plane to Waymart. This accident probably occurred as loaded cars were ascending No. 5], one of the wheels on which the rope revolves, gave way, and precipitated the whole train down the plain, throwing several of them off the track, braking the cars and doing considerable other damage. Fortunately no lives were lost nor were there any person injured, as we could learn." (*Carbondale Journal*, December 12, 1839, p. 2)

2942

Summit level, Rix's Gap, from the head of 5 to the head of 6, Level No. 1

"From the head of No. 5 was the level called 'summit level' 9250 feet long (or one and three-fourths miles) extending to the head of plane No. 6 on a descending grade of 8 feet to a mile; and crossing the turnpike about three-fourths of a mile west of the present 'light track' summit. / When Horatio Allen ordered for the Del. & Hud. Co. the first three locomotives ever brought to America, it was expected that one of them would be used on this summit level." (*Torrey*, 1882)

First car load of coal pushed across Summit Level in 1829 by hand by Daniel H. Fox:

In an undated newspaper article titled "The Celebrated Gravity Road" (probably published in the *Carbondale Leader* in the 1890s) in the archives of the Historical Society, the author reports the following fact about the first car of coal to travel over the line: "The first car load of coal went across the Gravity on Oct. 9, 1829. Daniel H. Fox, who worked for the D. & H. until his death, ran it over the summit of the mountain. On the summit it had to be pushed the whole distance by hand. [emphasis added] The system of stationary engines drawing up the cars by the ropes was much the same as at present."

Death of George Rix, 1836:

“DIED. / In Canaan, on the 18th inst. Mr. Geo. Rix. Mr. Rix was an old settler of this section of the country, and died in consequence of an injury received recently by an accident—one of his arms having been broken. (*Northern Pennsylvanian*, Saturday, July 23, 1836, p. 3)

“The summit ‘level’ extended from the head of Old No. 5 to the head of Old No. 6, and was about a mile and three-quarters long. From its eastern end, the road descended by three planes and three ‘levels.’” [1829: three planes (6, 7, and 8) and two levels (6-mile, 4-mile; 1845: two planes (6 and 7) and one level (10-mile level; 1859: three planes (9, 10, 11) and one level (10-mile level; 1868: four planes (9, 10, 11, 12) and one level (Level No.12)] (“An American Gravity Railroad,” by Charles W. Whiting. *Cassier’s Magazine*, Volume VIII, No. 2, June, 1895, p. 87)

The Levels; the Boarding Houses for the car runners:

“It was originally expected to make use of locomotive power on the three long levels, known as ‘summit level,’ ‘six mile level,’ and ‘four mile level,’ and to use horses on the other levels between the planes. / Three locomotives were made for the company in England under directions of Horatio Allen, and brought to New York [emphasis added] to be so used, but on the trial of one of them, the track was found too weak to admit of their use with safety; and the use of horses was thus made necessary on those levels also. / On the summit level one horse could not draw more than two loaded cars at a time. On the six mile level, between Waymart and Prompton, the grade was such that loaded cars descended by gravity, and cars were provided with a sufficient number of horses to ride with each train to draw the empty cars back—one horse being thus able to return four empty cars. These horses became so accustomed to riding down the grade that when, by reason of ice on the rails, the cars required force to propel them, some of the horses clearly showed an unwillingness to go upon the track and draw the cars in that direction. / On the four mile level, between Prompton and the canal basin, the grade was such that one horse could draw five loaded cars down, and the same number of empty cars back. / The four-mile and the six mile levels had each a branch or side track for a short distance, near the centre, so that cars moving in one direction could pass those going in the opposite direction, and at these branches were the boarding-houses for the car runners. One of these boarding houses was near the present residence of Jacob L. Keen, and was kept by Warren Dimock, and the other was opposite the present residence of Henry L. Phillips, and was kept by George M. Keen.” (*Torrey*, 1882)

Plane No. 6

On Planes 6, 7, and 8, where the loaded cars were descending, no motive power was required. A braking system was provided, consisting of two drums similar to those of the powered planes but connected merely to a heavy brake.

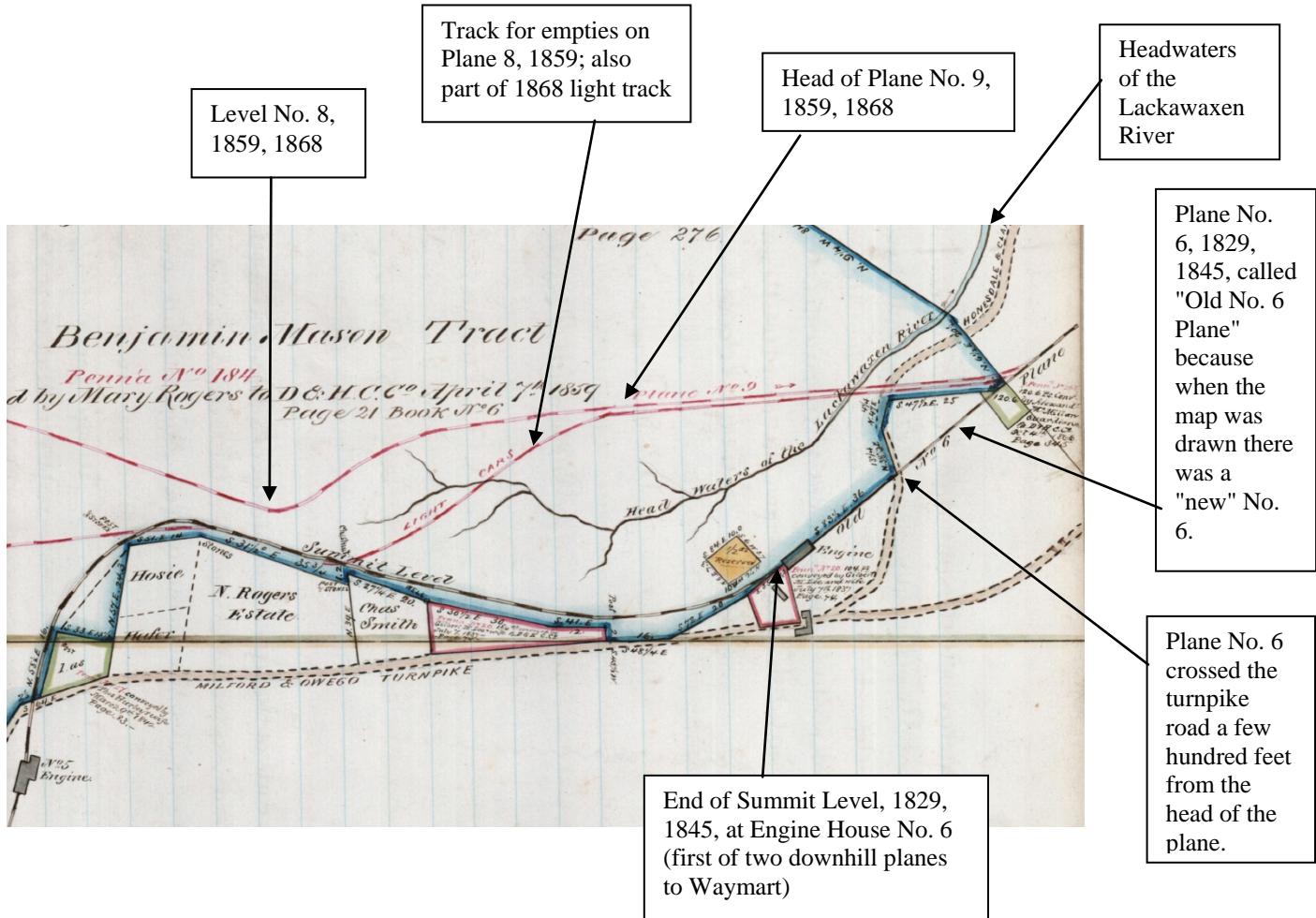
At this point in the rail system, the loaded cars were propelled down these three planes by gravity. N. H. Hiller says: "Here, since the loaded trip was going down, energy had to be dispelled by means of some sort of brake, and the simplest form of brake was utilized. The winding drum was connected to a large fan by a train of gears with the fan speed eight times that of the drum. These fans were like water wheels, ten feet in diameter with ten blades three feet wide and from six to eight feet long. The fans absorbed the energy easily and regulated the speed on the down trips to about fifteen miles an hour. Of course, the light trips on the return from Honesdale were drawn uphill by the loaded trips descending."

The fans, a braking method created by John Jervis, were in use as late as July 1830. Were they the best method of braking? More innovations followed, but not created by Jervis, who, having made the system fully operational, resigned as chief engineer of the entire system in May 1830, recommending that James Archbald be put in charge of the railway and mines, and that Russel F. Lord be put in charge of the canal.

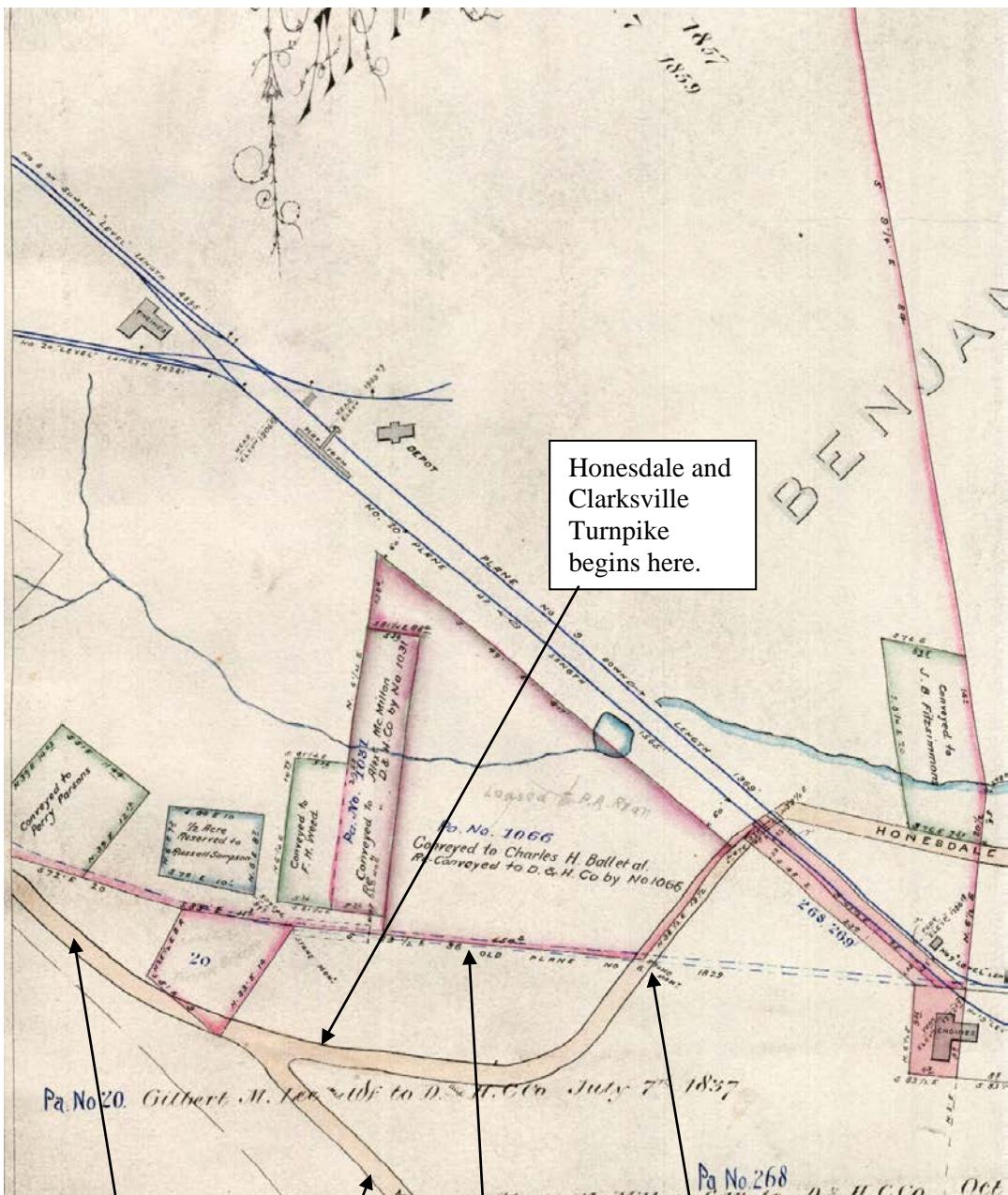
John Jervis, James Archbald, and Russell F. Lord all started their engineering careers as rodmen on the Erie Canal. Jervis trained under Benjamin Wright; Archbald and Lord trained under Jervis.

"Plane No. 6 was 4,300 feet long, descending on the eastern side of the mountain 349 feet, (or one in twelve and one-fourth). / A few hundred feet from the head of this plane it [the track] crossed the Honesdale turnpike. / From the foot of No. 6 was 400 feet of track, nearly level, to the head of Plane No. 7." (Torrey, 1882) John Jervis, in 1833, gave the statistics on Plane 6 as: 4,260 feet long, descending 353 feet.

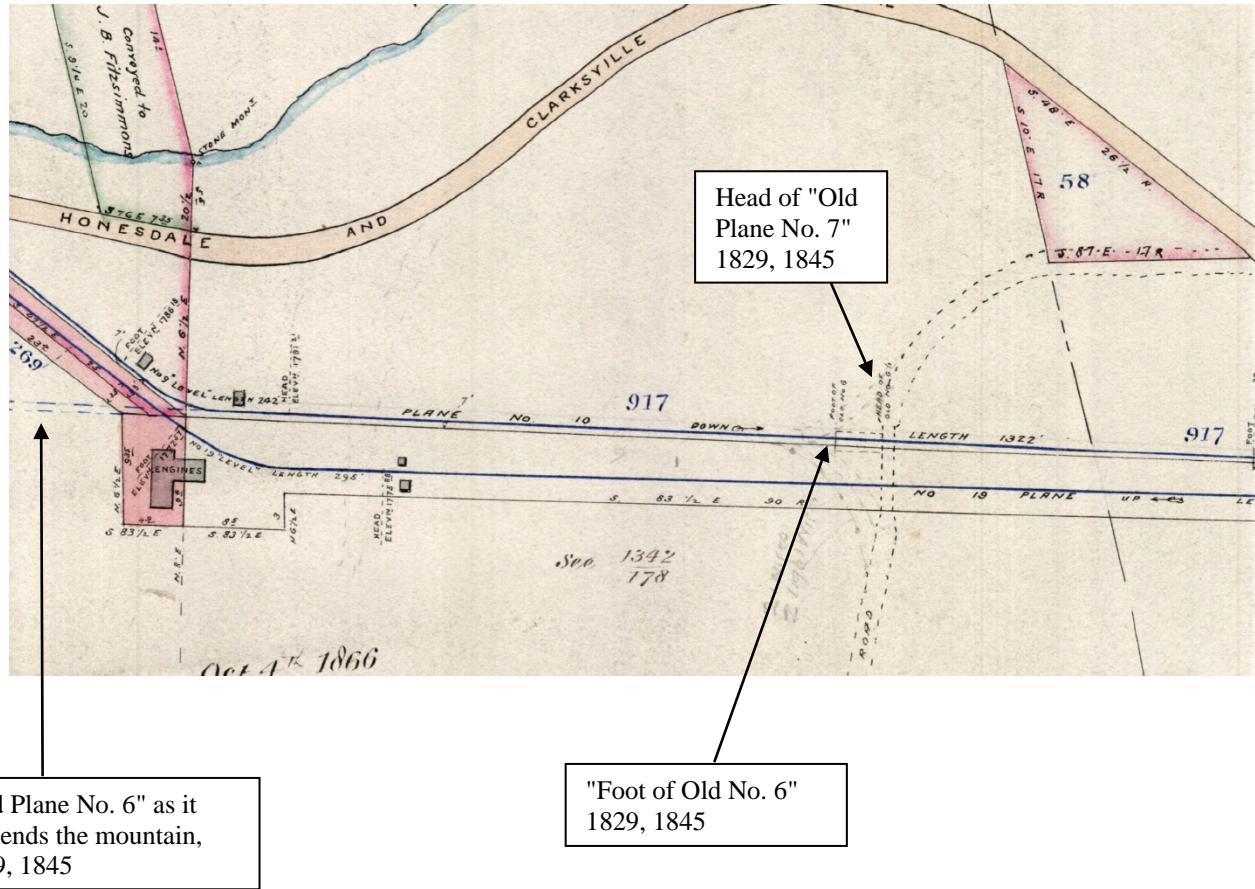
The head of Plane No. 6 and Plane No. 6 itself, in 1829 and 1845, are shown on the map on page 280 in D&H Deeds PA that illustrates the deed, pp. 276-279, dated March 31, 1857, between Lucy Rogers et al. and The Delaware and Hudson Canal Company.



Given below is a detail from the 1895 Gravity Railroad map volume. On this detail, we see Plane No. 6, as it descends the mountain, crossing the Honesdale and Clarksville Turnpike as it does so.



The foot of "Old Plane No. 6" (i.e., Plane No. 6 in 1829) was in the middle of what would later become Plane No. 10, as we can see on this detail given below from the 1895 Gravity Railroad map volume. Also shown on this map is the head of "Old Plane No. 7," 1829, 1845



Plans were also drawn up by William J. McAlpin (see the note here under Six-mile Level) for a rollway at the heads of Planes 5 and 6. These rollways were switching configurations: a car could be run onto a rollway, which could then be pushed sideways to line up with an adjoining track. Were these roll-ways ever built? Not sure. The 1829 configuration was single-tracked with passing turn-outs in the middle of the planes. Here is McAlpin's plan for the rollways at the heads of Planes No. 5 and 6 in the 1829 configuration:

First
Plan of Roll-way-Pav for Head of
Planes Nos 5 and 6

The joint or end of Roll-way at 2 for Plane No 5 to
be $6\frac{1}{2}$ feet from Center of Drive wheel and the same
joint for Roll-way at Plane No 6 to be $10\frac{1}{2}$ feet from
Center of drive wheel. The 2^d Roll-way must cross the
3 roads but only requires a single way.

General Remarks It is not necessary that
the permanent supports of the road be placed so far as re-
presented in the plan for the Roll-way joints, except the
support for the road is connected with the machinery: but
may better be placed so as to allow the rough timber to project
from 3 to 6 inches by its supports.

These plans were unsigned but
it is possible that they were
prepared by Wm P. Mc Alpin
about 1830 for J. B. Jervis.

“Middle Six”; the Oldest Man Employed on the Road Worked Here

Plane No. 6, it seems, was called “middle Six” by railroad folks at the time, probably because No. 6 was, in effect, in the middle of the Gravity Railroad: the beginning of the downgrade to Honesdale. Here is the notice of the death of Alexander McMillen that was published in the *Carbondale Leader* of June 15, 1883 (p. 3). In this notice is the only place where I have ever seen the term “middle Six” used. “Alexander McMillen, engineer at No. 19, died at his home, near Waymart, last Wednesday evening, of quinsy,--aged about 78 years. Mr. McMillen was born at Montrose, Susque. co., in the year 1805, and there he spent his boyhood days. He came to Wayne county when the D. & H. C. Co. was in its infancy and helped to clear a place on the old summit where the gravity road was first built. After the road was finished and the coal began running over it he took the wheel at what was known as ‘middle Six,’ which position he held until the loaded track was changed to where it now is. He then took the wheel at No. 10 which he run[sic] for several years. He was then sent to No. 9 and run the wheel there until the engines were built that pulls the light cars from Waymart to the Summit. He was then promoted to the position he held up to the time of his death. He was the oldest man employed on the road, and one who had been faithful to his employers under all circumstances. He was a man respected by all for honesty and uprightness in every transaction; --he always had a pleasant word for every one, and will be missed by those who were employed under him, as well as by every one in this community. He had enjoyed good health the greater part of his life until about a year ago since when he had several sick spells. Trouble seemed to come to him thick and fast for the past four months; for in that time he had lost by death a son, daughter and sister. He was taken sick last Sunday and only lived three days. We would extend to the bereaved wife our heartfelt sympathy in this hour of her intense sorrow. May the one that ‘doeth all things well’ comfort and sustain her. The funeral will be held from the house this (Friday) afternoon at two o’clock. / WIDEAWAKE.” (*Carbondale Leader*, June 15, 1883, p. 3)

Phillips fell asleep on the tracks and was killed:

“HOW PHILLIPS MET HIS DEATH. Exhausted by Loss of Sleep He Fell on the Track and Was Killed. / At two thirty today the funeral of John Phillips was held at the home of his sister, Mrs. John I. Thomas on Grove street, Rev. W. B. Grow officiating. There were many flowers there to mark the last offering of esteem of his friends a large concourse of whom had gathered on this sad occasion with the mourning family that followed the remains to the place of interment in Maplewood cemetery. / Brief notice of John Phillips’ death was given in Saturday’s paper. It occurred under very sad circumstances. He fellow workmen had seen him leave the train full of life to warn train 11 that was due of the nearness of his train and the next time they saw of their fellow workmen only his mangled remains. They say he placed two torpedos on the track and then it is thought he sat down on the rail to wait the coming of the train and fell into a doze from which he never awoke for the approaching No. 11 killed him. Rush of business has kept all of the men at work over hours of late and the unfortunate man had had but little rest. / He

was born at No. 6 Gravity twenty-five years ago and for the past four years had been employed by the Ontario & Western company as a brakeman. Previous to that time he worked at the head of two on the gravity. His aged parents Mr. and Mrs. William Phillips are still living and three sisters Mrs. Charles Swan, Miss Nellie Phillips and Mrs. John S. Thomas and one brother Harry Phillips still survive. Up to four weeks ago the young man resided with his sister but on account of her ill health he had boarded with Mrs. Walters on Church street since then. / He was a very much esteemed young man well known throughout the city and very well liked by his employers and his fellow workmen. Many join with the family in mourning his loss. (*Carbondale Leader*, October 30, 1899, p. 5)

The three planes from Farview to Prompton:

“On the three planes on the Waymart-Prompton [this should read “Farview-Prompton] section of the railroad, the motive power was the force of gravity alone. Two ‘drums’—without an engine—were set up at the head of each plane, and while two loaded cars were going down one track, they would pull two empty cars up on the other. The horses could not negotiate the steep planes, but they resumed their loads on the upward run on the gently sloped levels.” (*Carbondale News*, 01-10-2001, p. 7. full page article on Archbald to commemorate the 125th anniversary of Saint Thomas Aquinas church)

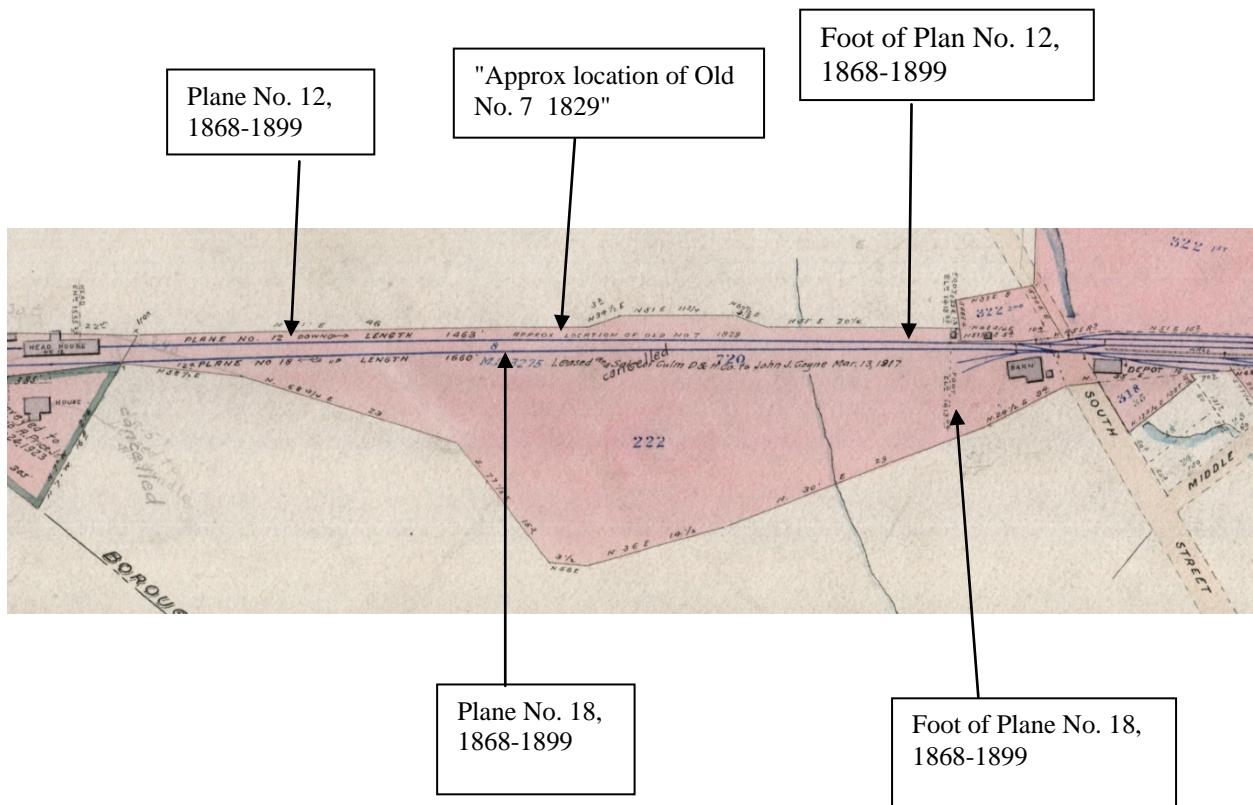
“The three planes descending toward Honesdale were worked by gravitation, without the use of steam,—by having the descending loaded cars draw up the ascending empty cars attached to the other end of the chain, and the velocity of their motion was controlled by the use of friction brakes upon the shaft of a large, upright fan wheel.” (*Torrey*, 1882)

2945

Plane No.7

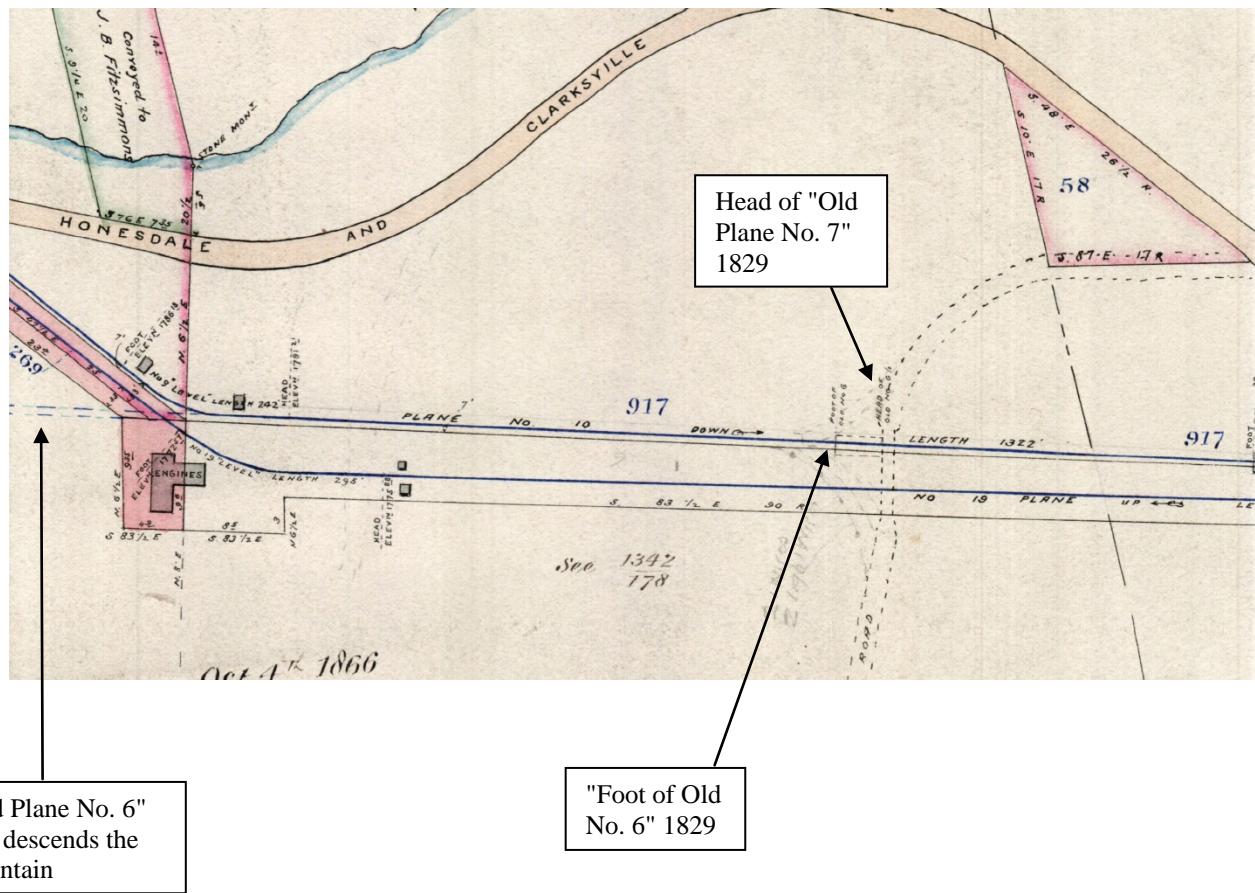
“From the foot of No. 6 was 400 feet of track, nearly level, to the head of plane No. 7. This plane was 1500 feet long and descended 120 feet, or one in eleven and one-half, to the level at Waymart. This point is 452 feet higher than the canal at Honesdale, and 1422 feet above tide level.” (*Torrey*, 1882) John Jervis, in 1833, gave the statistics on Plane No. 7 as follows: 1,524 feet long, descending 127 feet.

The "Approx. location of Old No. 7 1829" is shown on the detail given below from the 1895 Gravity railroad map volume.

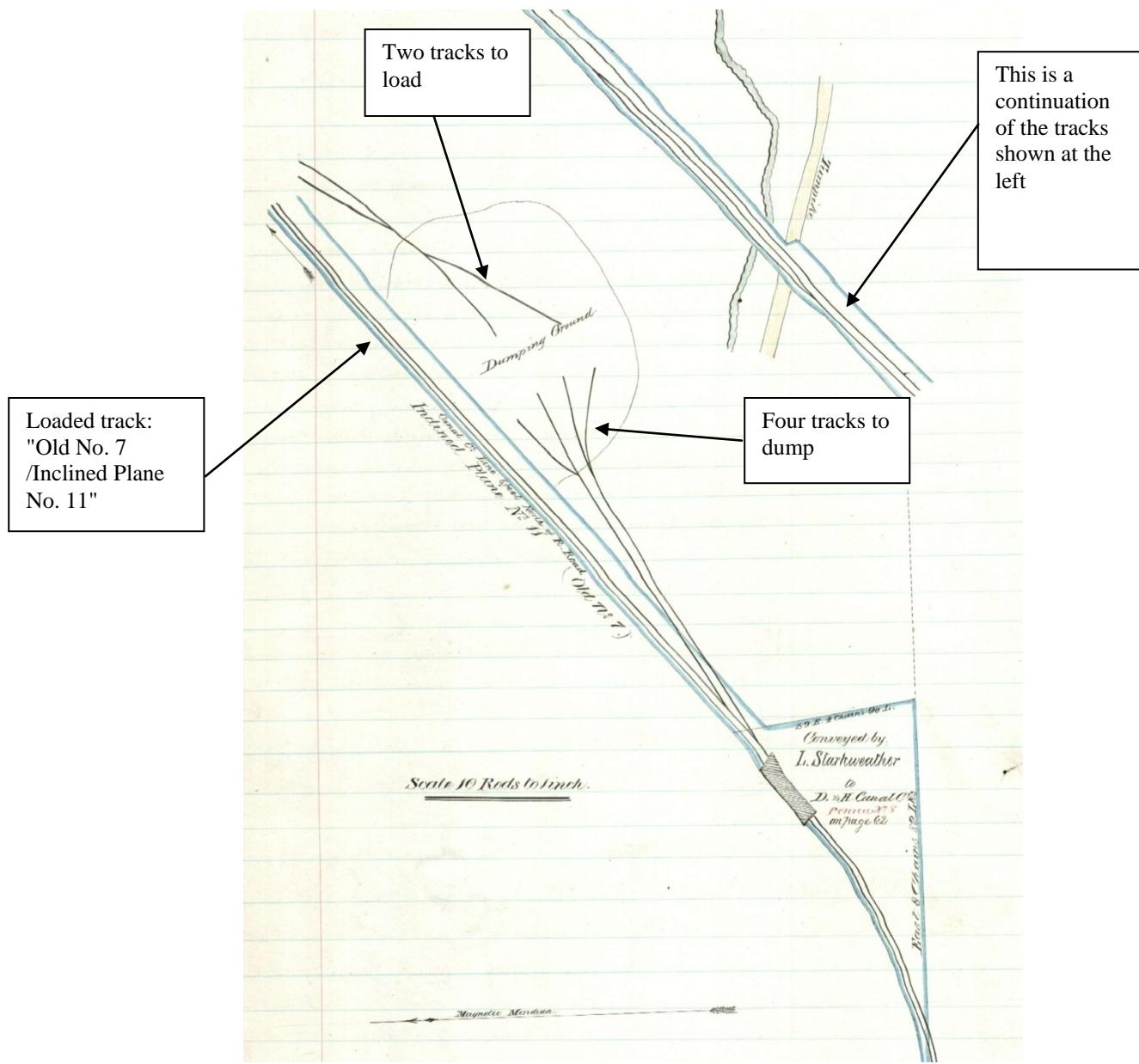


Gravity Railroad map volume

Detail, showing head of "Old Plane No.7" 1829 configuration:



In the *D. & H. Deed Book – Wayne*, on page 6, there is a map that illustrates the deed on page 5, dated November 20, 1829, between Leonard Starkweather and wife and The Delaware & Hudson Canal Company. On that map, Old No 7 (later to become Plane No. 11) and the Dumping Ground at Waymart are shown. Four tracks to dump; two tracks to re-load. Here is that map.



Hensel stereograph card No. 1116: *Waymart, seen from Old Dumping Ground*



The Dumping Ground referred to above is where coal was unloaded and temporarily warehoused at Waymart. Given the fact that the map that illustrates the deed referenced above, dated November 20, 1829, between Leonard Starkweather and his wife and the D&H shows the “Dumping Ground” at Waymart, it is possible that coal was dumped/stored at Waymart as early as 1829.

At the time that Hensel produced Stereograph Card No. 1116, 1879, shown above, the “Dumping Ground was no longer a reality, since in the title of that card the Dumping Ground is referred to as the “Old, i. e., “former” Dumping Ground.” When the “Old Dumping Ground” ceased to be used as such (before 1879) is not yet known. A photograph of coal storage piles at Waymart is not known to exist.

Statements in print about coal dumping/storage in piles at Waymart are rare. In 1855 (we learn from the clipping given below) that coal was being dumped/stored at Waymart:

“Statement of the business of the Delaware and Hudson Canal Co. for the year ending March 1, 1855.” Therein, we read: “Coal on hand, being principally in pile at Honesdale and Waymart, and in boats on line of Canal.....\$184,092.00.” (*Carbondale Transcript and Lackawanna Journal*, April 6, 1855, p. 2)

In early July 1862, coal was apparently not being dumped at Waymart. This we know from the clipping given immediately below, from which we learn that the D&H temporarily stopped mining and shipping coal at that time because (1) the repairs to the D.&H. Canal then being made were taking longer than expected and, (2) because the Honesdale coal pockets were full.

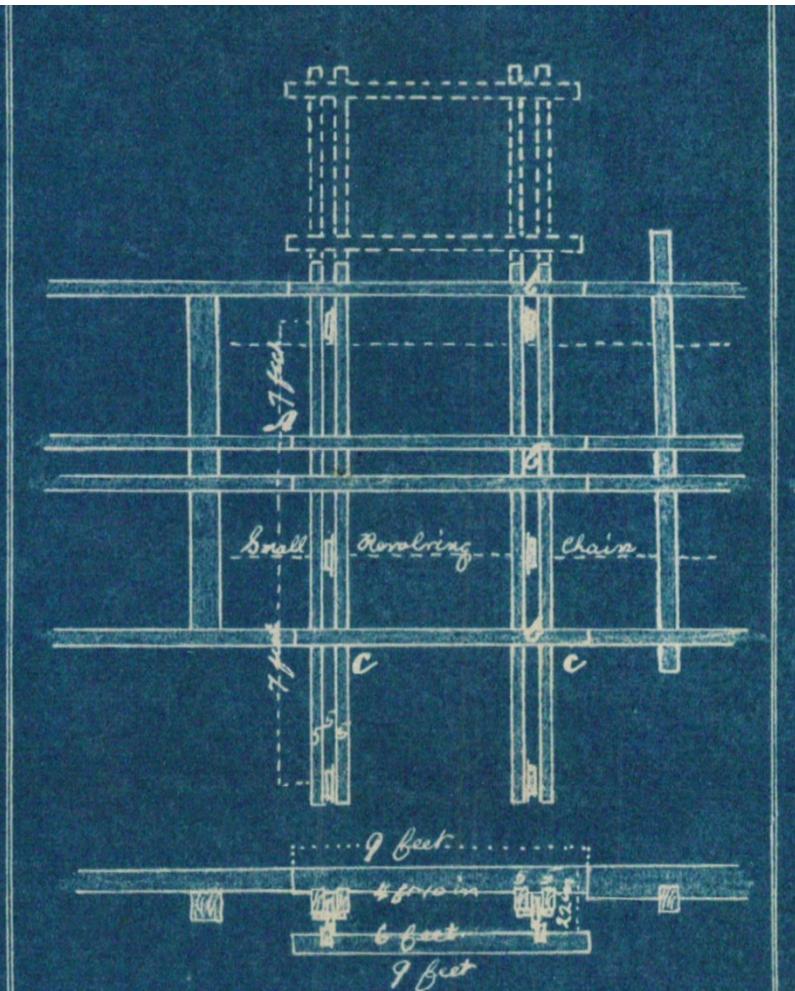
“The Coal Business. / The repairs upon the Canal of the D. & H. C. Co., are taking more time than was at first expected. It is now expected to be ready early next week. The amount of coal stored at Honesdale has reached its maximum, and the Company has been obliged to discontinue mining and sending it over the Railroad until shipments can be made on the canal.” (*Carbondale Advance*, July 12, 1862, p. 3)

In early April, 1863, however, with the coal pockets at Honesdale nearly filled, the D&H did not stop mining and shipping coal over the Gravity Railroad. Rather, they dumped/stored coal at Waymart:

“Coal Shipments. / It will be seen by reference to the published statement that the D. & H. C. Co. have already mined and shipped over the railroad to Honesdale upwards of 200,000 tons of coal the present season. This is a larger amount than was ever before forwarded, we believe, this early. The pockets at Honesdale, we learn, are nearly filled, and the coal is now being dumped at Waymart. Some difficulty is experienced in emptying the cars there fast enough to prevent obstruction. [emphasis added] / We are glad to learn that miners and others in the employ of the Company have received an advance in wages of about 15 per cent.” (*Carbondale Advance*, April 4, 1863, p. 2)

“The Delaware and Hudson Canal is now in full operation. They have 210,245 tons of coal piled here [Honesdale] and about 20,000 tons at Waymart. [emphasis added] It is the intention of the Company to do a largely increased business the coming season.—*Honesdale Republic.*” (*Carbondale Advance*, April 30, 1864, p. 2)

Plans were also drawn up by William J. McAlpin (see the note here under Six-mile Level) for a rollway at the foot of Planes 7 and 8. These rollways were switching configurations: a car could be run onto a rollway, which could then be pushed sideways to line up with an adjoining track. Were these roll-ways ever built? The 1829 configuration was single tracked, with passing turn-outs in the middle of the planes. Here is McAlpin's plan / drawing (scale: 8 feet to an inch) for the rollway at the foot of Planes No. 7 in the 1829 configuration:



Plan of Roll-way Pass for foot of,
Plane No 7

The joint at A, to be $6\frac{1}{2}$ feet from Centre of
sheeve wheel. The Roll-way has a double road
as may be seen from the drawing.

The second Roll-way, at the foot of the Plane
has also a double road, but the wheels may be
placed differently, as follows, the end wheels under
the center of the outside Rail timber, and the center
wheels exactly in the center between the two roads,
as b, b, b, and the ways will be cut off at C C

Six-mile Level (Level 2)

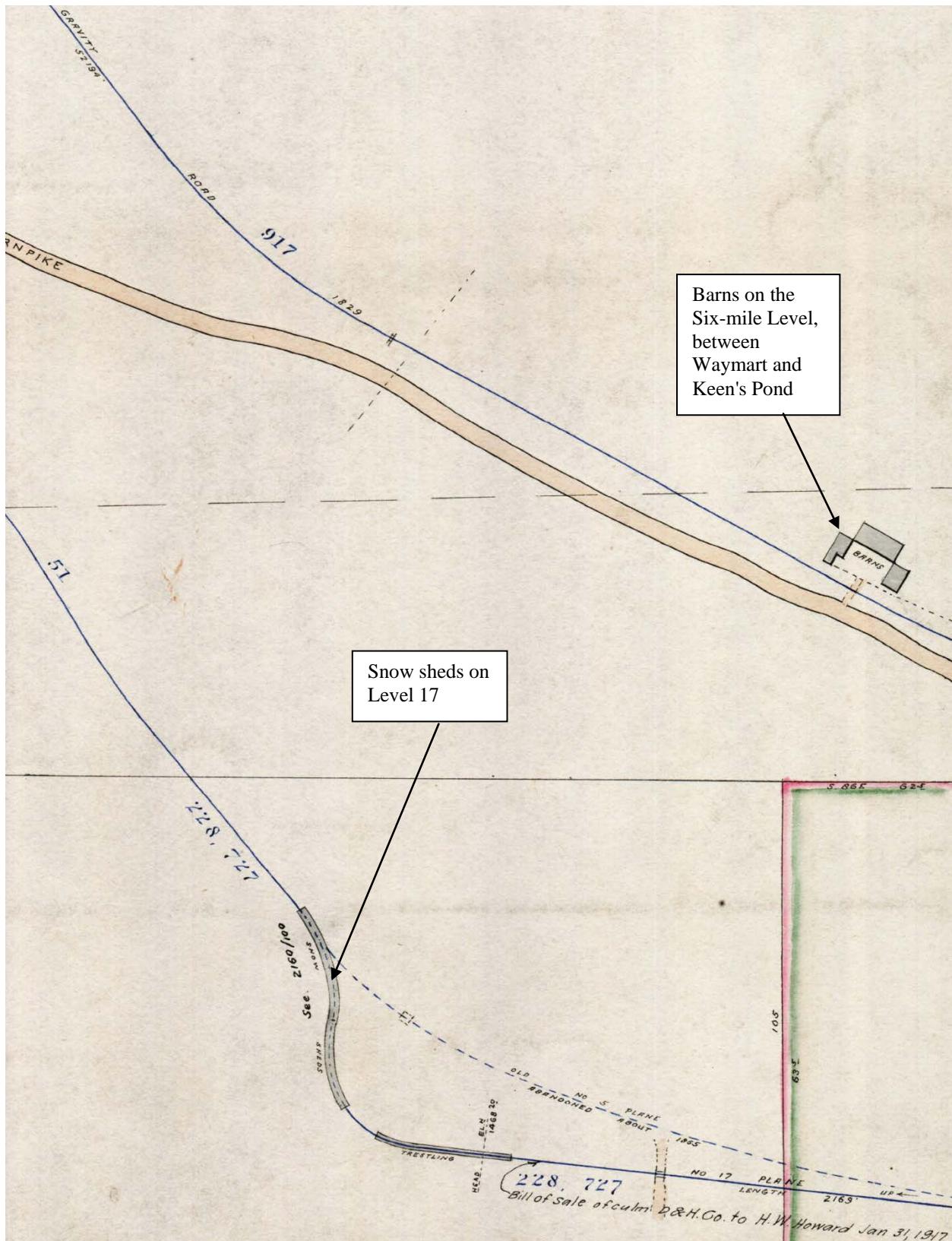
Waymart to Prompton: "From the foot of No. 7 was the long, or 'six-mile level', descending 264 feet, or 44 feet in a mile, to the head of plane No. 8, at Prompton. / The route of the present [1882] track for loaded cars, from the middle of plane No. 6 to the head of No. 8, at Prompton, is very nearly on the same ground as the original road, and with the exception of the part between the D. Blandin place and the canal basin, is the only part which is on the original route." (Torrey, 1882)

The cars were allowed to descend the six-mile level by gravity, and their speed had to be controlled. Various schemes were tried, amongst them being an elaborate windmill affair, connected to the axles by ropes or belts and retarding the speed by friction. This idea was soon discarded and a simple brake using the pressure of a bent sapling applied directly on the wheels came into general use.

Fire on Six-mile Level in 1833:

"Fire. / On Sunday evening last, a barn belonging to the Delaware and Hudson Canal Company, situate on the Rail Road, at the Six Mile Level, was consumed by fire, together with eight or ten horses and a quantity of hay. We have learnt no further particulars respecting this occurrence." (*Northern Pennsylvanian*, Thursday, January 16, 1833, p. 3)

The barn on the Six-mile Level that was consumed by fire in January 1833 may well have been on the site of the barns shown on that level in the 1895 Gravity Railroad map volume.



The Levels:

"It was originally expected to make use of locomotive power on the three long levels, known as 'summit level,' 'six mile level,' and 'four mile level,' and to use horses on the other levels between the planes. / Three locomotives were made for the company in England under directions of Horatio Allen, and brought to New York to be so used, but on the trial of one of them, the track was found too weak to admit of their use with safety; and the use of horses was thus made necessary on those levels also. / On the summit level one horse could not draw more than two loaded cars at a time. On the six mile level, between Waymart and Prompton, the grade was such that loaded cars descended by gravity, and cars were provided with a sufficient number of horses to ride with each train to draw the empty cars back—one horse being thus able to return four empty cars. These horses became so accustomed to riding down the grade that when, by reason of ice on the rails, the cars required force to propel them, some of the horses clearly showed an unwillingness to go upon the track and draw the cars in that direction. / On the four mile level, between Prompton and the canal basin, the grade was such that one horse could draw five loaded cars down, and the same number of empty cars back. / The four-mile and the six mile levels had each a branch or side track for a short distance, near the centre, so that cars moving in one direction could pass those going in the opposite direction, and at these branches were the boarding-houses for the car runners. One of these boarding houses was near the present residence of Jacob L. Keen, and was kept by Warren Dimock, and the other was opposite the present residence of Henry L. Phillips, and was kept by George M. Keen." (Torrey, 1882)

The Horse Cars:

In the archives of the Pike County Historical Society at Milford, PA, we discovered, on 09-20-2103, eleven blueprints showing line drawings of 1829 Gravity Railroad rolling stock or trackage or features of the D&H Canal and its locks. All of these blueprints were created, it appears, at the time that E. D. LeRoy wrote *The Delaware & Hudson Canal and Its Gravity Railroads*, which was published by the Wayne County Historical Society in 1980.

In the lower right-hand corner of these blueprints, we read: "EX LIBRIS / E. D. LeRoy," followed by a number. The numbers appear to indicate a number in a sequence of blueprints which E. D. LeRoy apparently had produced of old documents relating to the D&H Canal Company. It appears that he had these blueprints created as a way of preserving fragile old documents about the D&H. One can not help but wonder if those fragile old documents still exist.

Here is a summary description of those eleven blueprints:

1. #17 paddle gate irons for locks on D & H canal
2. #221 Gilson's locks: survey by Lord, Butler, April 1854
3. #223 Baisden's lock (with #225 on the same blueprint): survey by Lord, Butler, April 1854
4. #224 Ridgeway's locks: survey by Lord, Butler, April 1854
5. #225 Pool-Pit Basin [at the Narrows of the Lackawaxen River]
6. #264 roll ways
7. #265 dry wall lock with timber and plank facing
8. #266 light rail road wagons for mules and horses
9. #267 coal waggons
10. #268 mitre sill and gate recesses for locks; re-drawn from original plans of 1827
11. No number lock gates for the Delaware & Hudson Canal, upper and lower gates, type used 1827-1850

How many blueprints were produced? It appears that there were no less than 268. There are eleven in the Pike County Historical Society archives. If there were others, do they still exist?

One of those blueprints, numbered 266, shows three line drawings of "Plan of Light Rail Road Waggons for conveying Mules and horses Down the descending part of Carbondale Road."

A scan of the note on this blueprint ("Scale one Foot to 5/8 Inch") is given below:

Plan of Light Rail Road Wagon for conveying Mules and
horses Down the descending part of Carbondale Road

Scale one foot to $\frac{5}{8}$ Inch

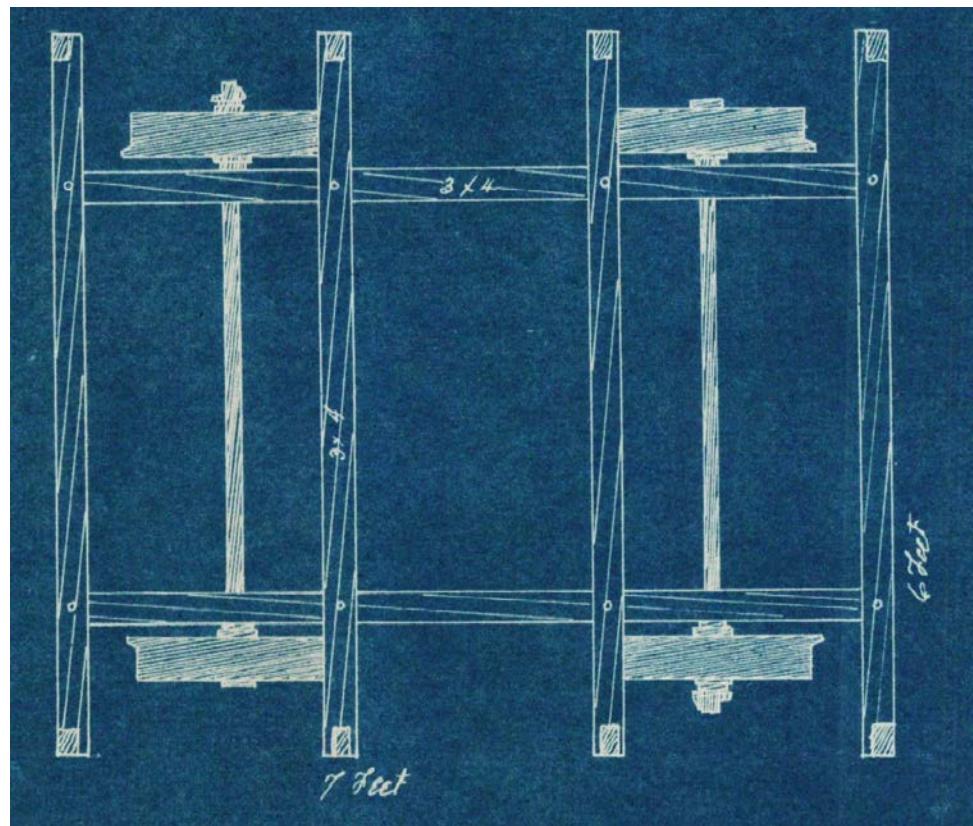
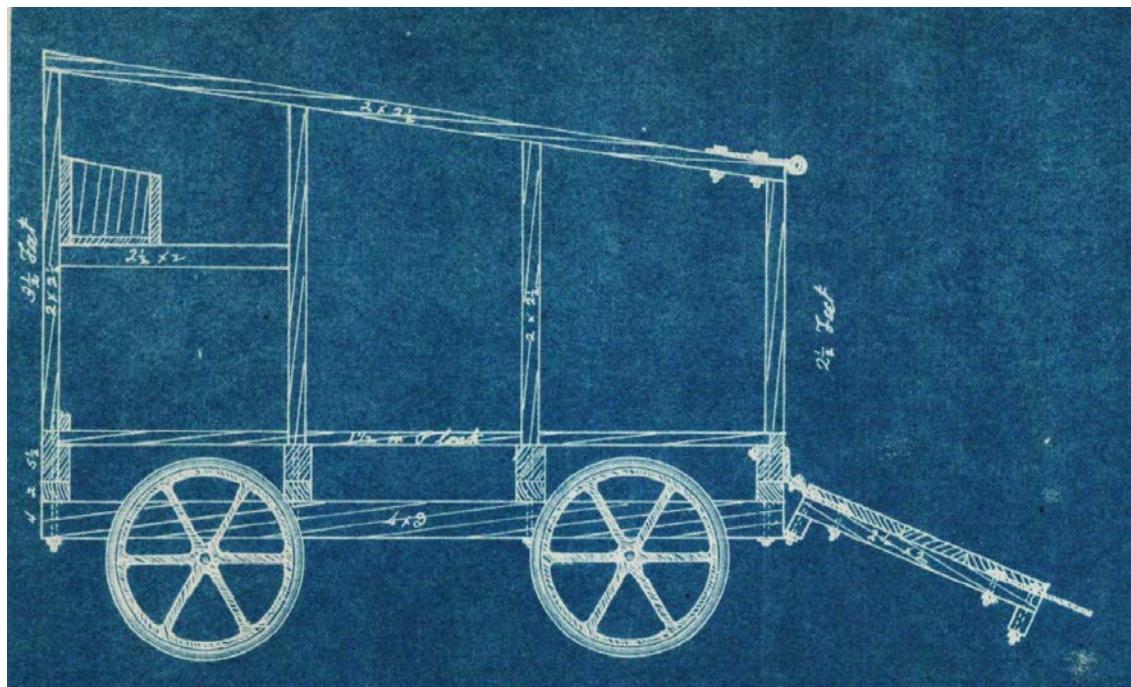
July 11/1876 This drawing was made by me about
the year 1830 or 1831 by Mr Jervis direction it
being My first introduction as an Engineer in his
Service (I was then an apprentice in My fathers
Machine shop) Wm J Mc Alpin

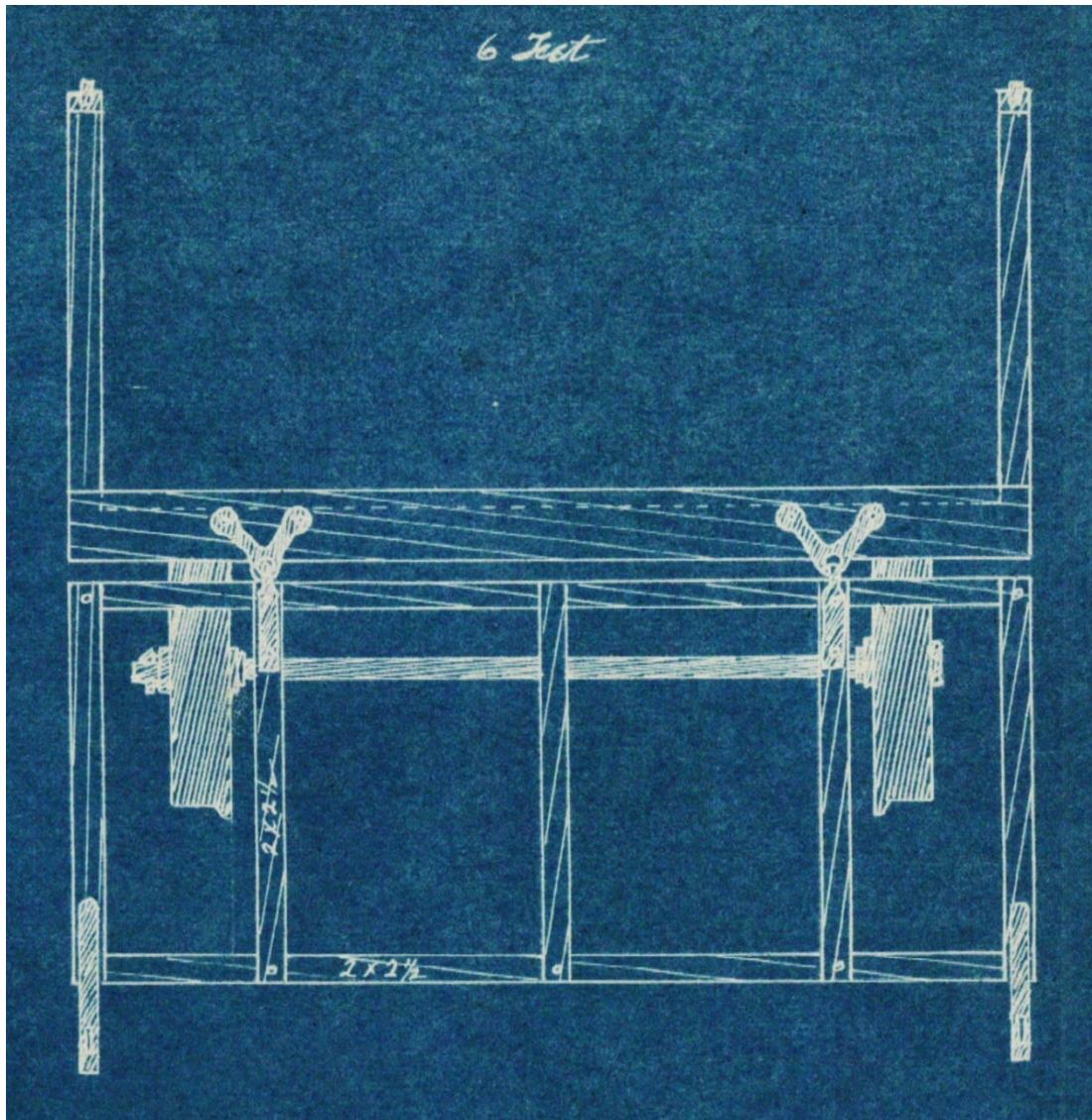
D. H. CANAL COMPANY'S GRAVITY RAILROAD.

On the original drawing of this plan for the horse and mule cars used on the Six-mile Level, William Jervis McAlpin wrote (see above blue print), on July 11, 1876 the following:

"July 11 / 1876 This drawing was made by me about
The year 1830 or 1831 by Mr. Jervis direction it
Being My first introduction as an Engineer in his
Service (I was then an apprentice in My fathers
Machine Shop) Wm J Mc Alpin"

Here are the three line drawings by William J. McAlpin for the railroad wagons for horses and mules on the Six-mile Level:



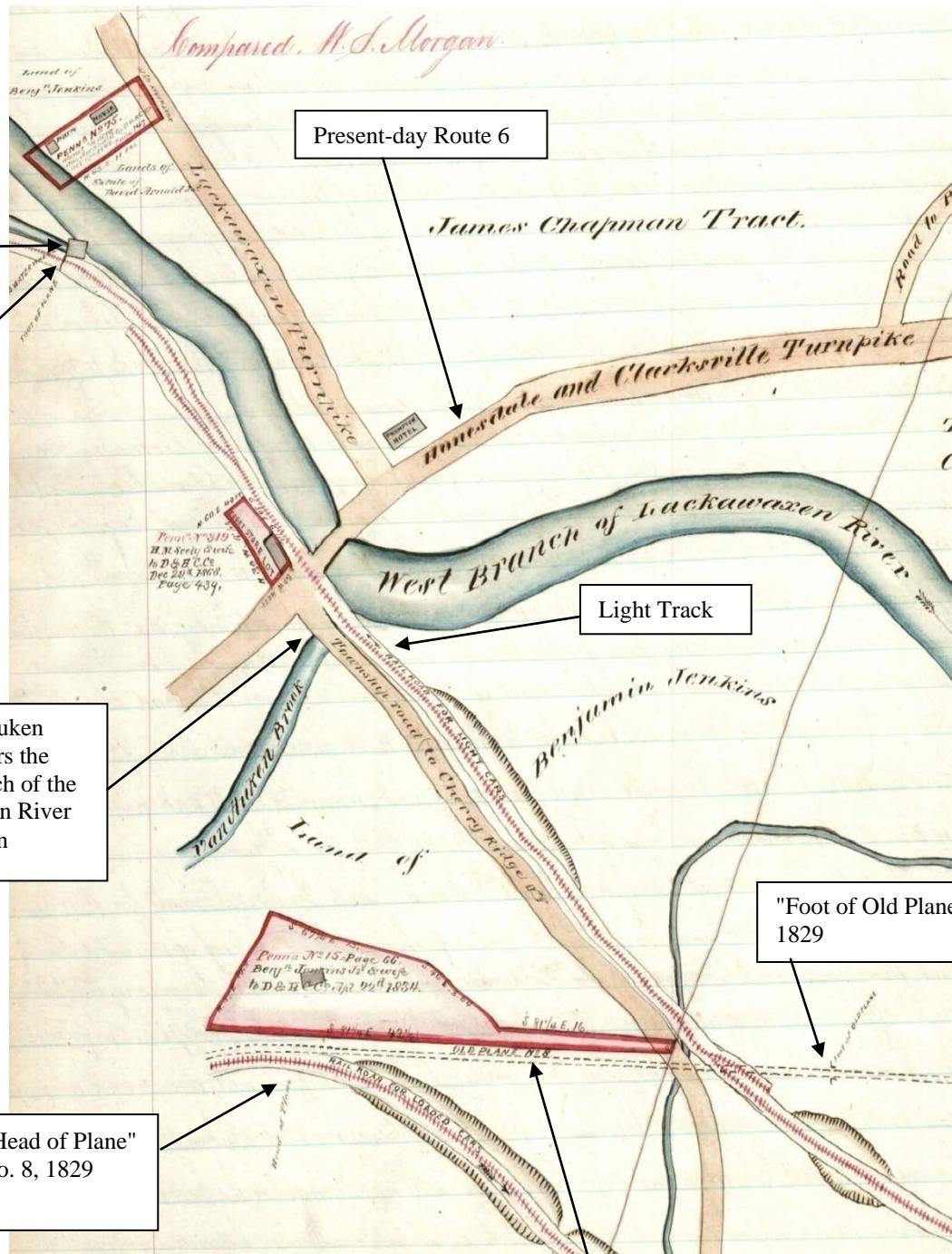


2947

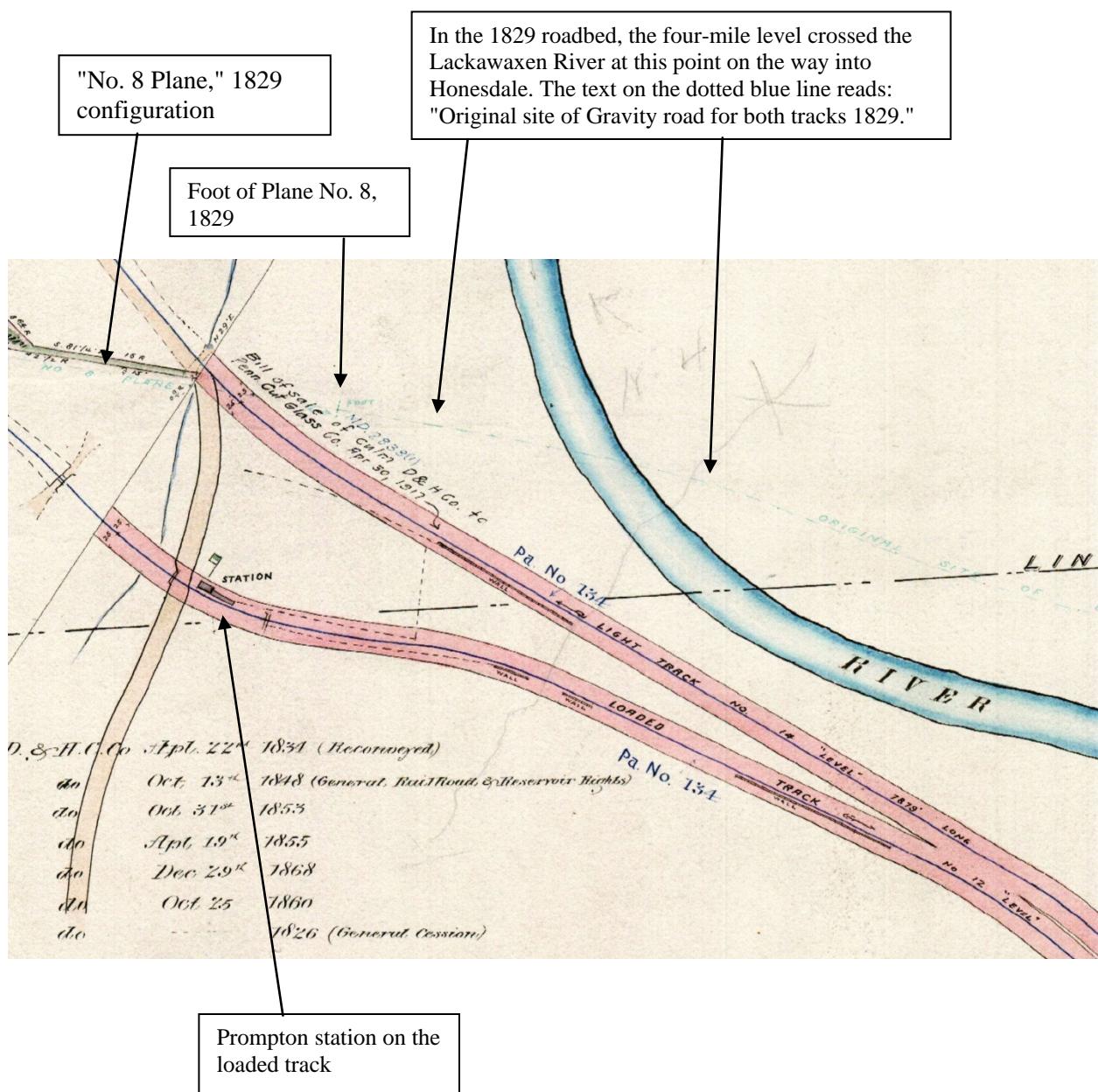
Plane No. 8

“The head of Plane No. 8 was at the point where passengers going toward Honesdale take or leave the cars, on the hill in Prompton. / From this point the plane extended 1444 feet, and descended 70 feet, or one in twenty and one half, to the west branch of the Lackawaxen, at the lower end of the Prompton flat.” (Torrey, 1882)

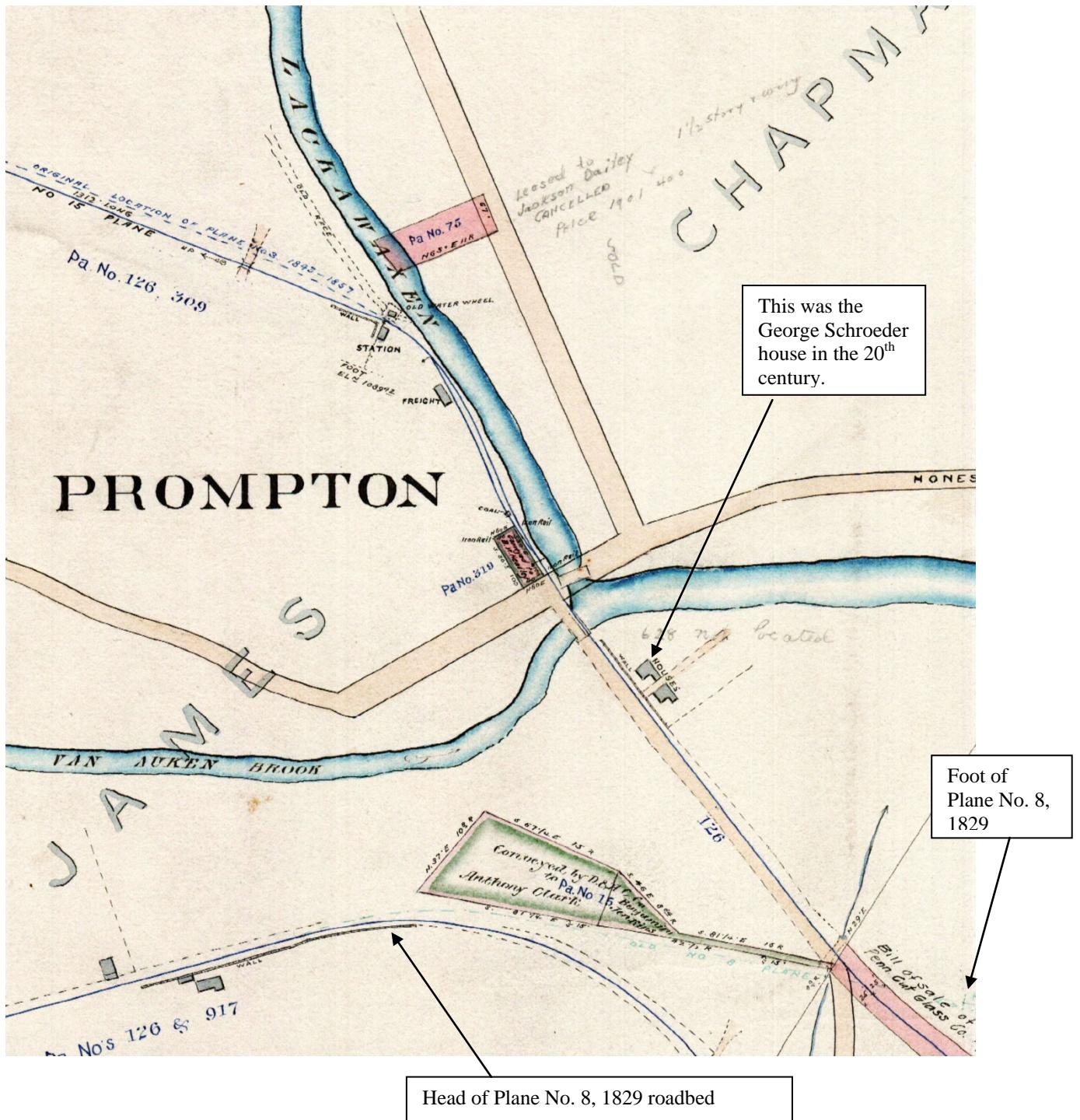
In the *D. & H. Deed Book – Wayne*, on page 86, there is a map that illustrates the deed, pp. 85-86, dated December 27, 1842, between George Rix and wife and The Delaware & Hudson Canal Company. On that map, Old Plane No. 8 in the Prompton area is shown. This is one of only two maps known to exist that show the exact location of Plane No. 8 in the 1829 configuration. The later installed light and loaded tracks are also shown. Here is that map.



In this view from the 1895 Gravity Railroad map volume, we see a portion of Level 14, descending towards Prompton. On the loaded track, on the far left, the Passenger Station on the loaded track at Prompton. We also see important data about the 1829 configuration: the location of the four-mile level (from the foot of Plane No. 8 to Honesdale)—on the other side of the Lackawaxen River from where the light track was positioned in 1843.



A second look at the Prompton area, showing all of Plane No. 8 in the 1829 configuration of the road. Note that it is at Prompton that the Van Aukens Brook flows into the Lackawawen River.

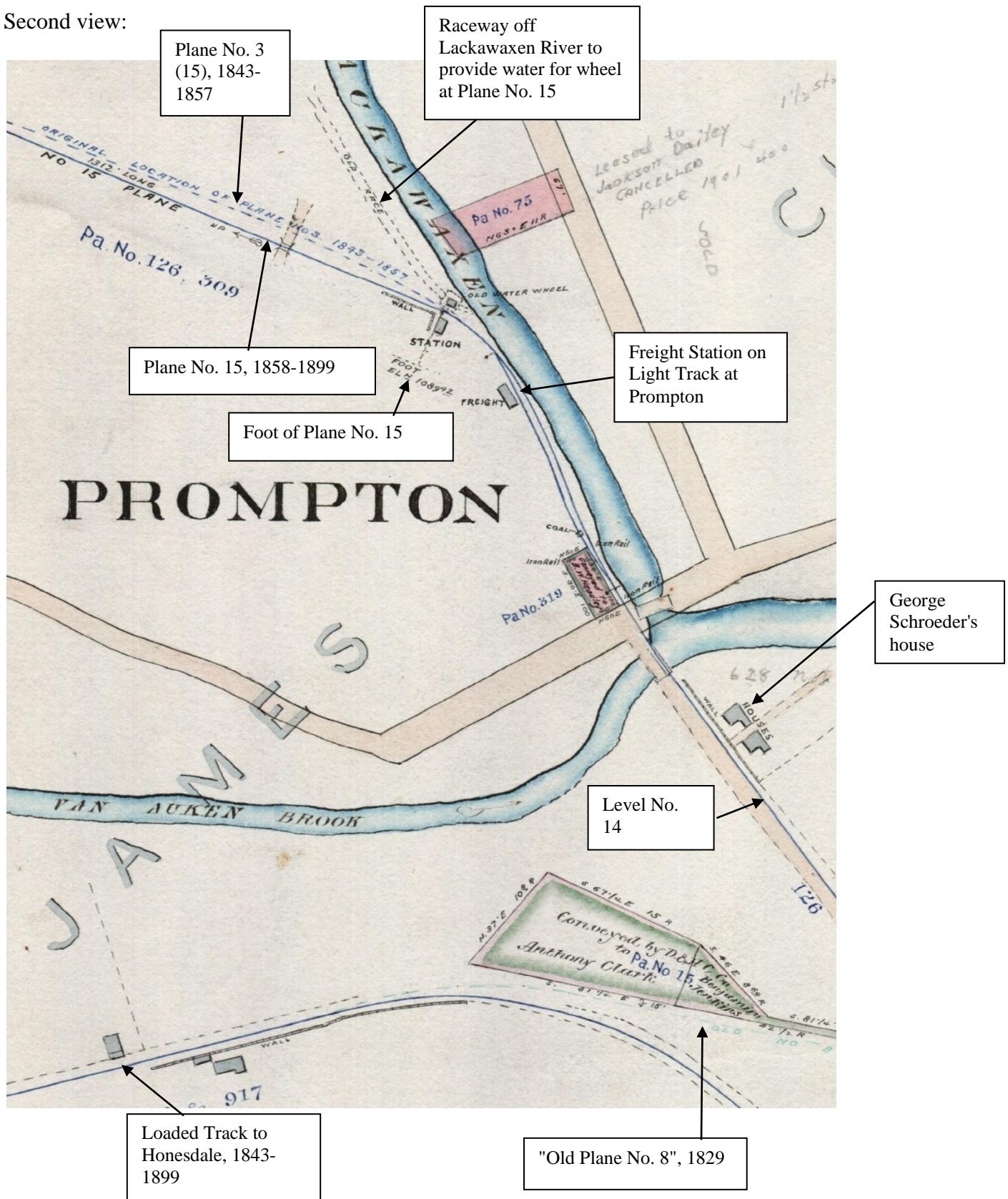


1895 Gravity Railroad map volume: two views

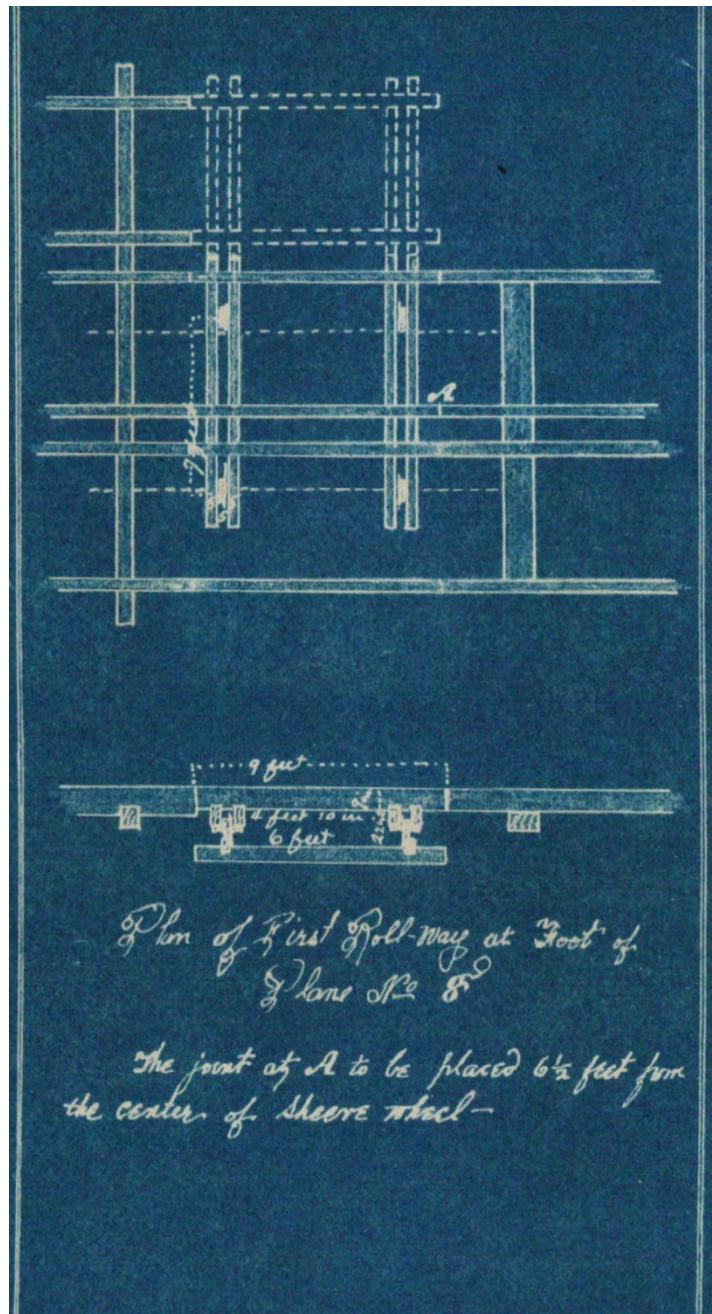
In this view, we see the Loaded Track coming down into Pompton. Just after it crosses the road above George Schroeder's house (the house in the lot marked "628"), we see the passenger station, on the north side of the track. A section of Level 14 goes right in front of George Schroeder's house and crosses the Honesdale Turnpike to the foot of No. 15, where the passenger and freight stations on the light track at Prompton are located. Original location of light track marked in blue; also, the exact placement of Original Plane No. 8.



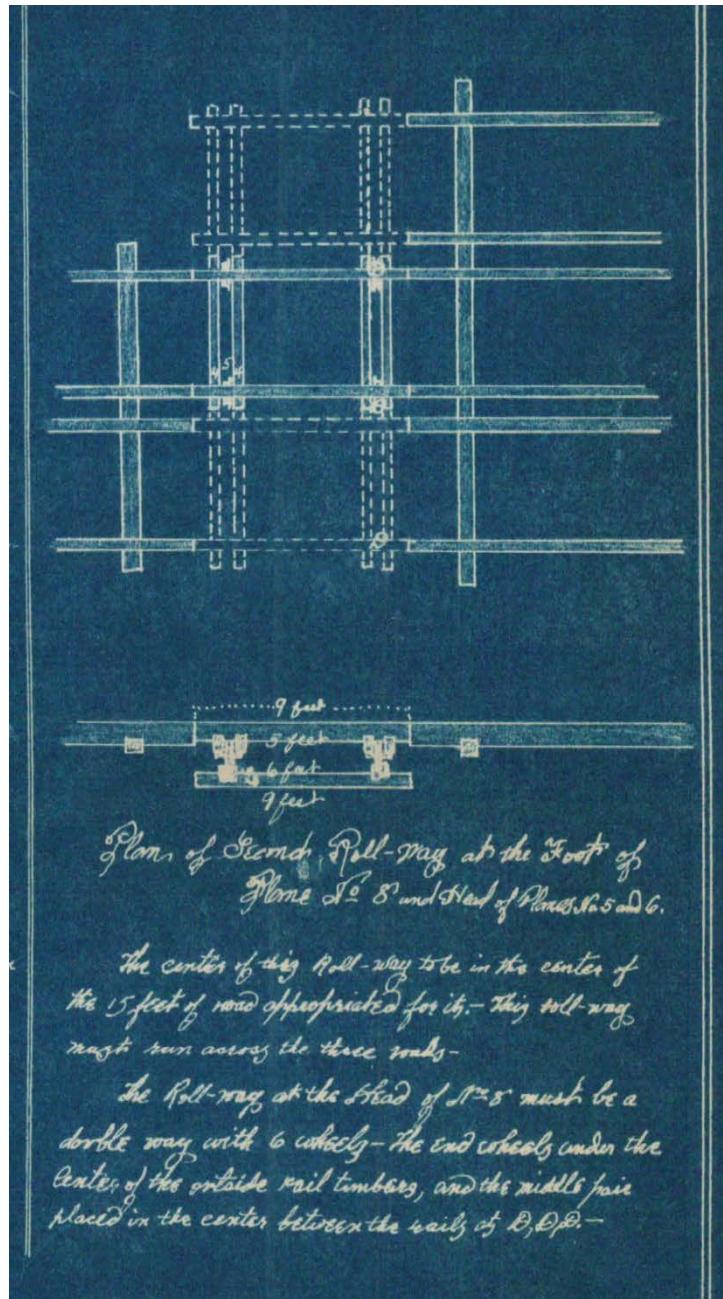
Second view:



Plans were also drawn up by William J. McAlpin (see the note here under Six-mile Level) for a rollway at the foot of Planes 7 and 8. These rollways were switching configurations: a car could be run onto a rollway, which could then be pushed sideways to line up with an adjoining track. Were these roll-ways ever built? Not sure. The 1829 configuration was single tracked, with passing turn-outs in the middle of the planes. Here is McAlpin's plan / drawing (scale: 8 feet to an inch) for the rollway at the foot of Planes No. 8 in the 1829 configuration:



Plans were also drawn up by William J. McAlpin (see the note here under Six-mile Level) for a rollway at the foot of Plane 8 as well as one at the head of Plane No. 8. These rollways were switching configurations: a car could be run onto a rollway, which could then be pushed sideways to line up with an adjoining track. Were these roll-ways ever built? Not sure. The 1829 configuration was single-tracked with passing sidings/turn-outs in the middle of the planes. Here is McAlpin's plan / drawing (scale: 8 feet to an inch) for a roll-way at the foot of Planes No. 8 and for one at the head of Plane No. 8 in the 1829 configuration:

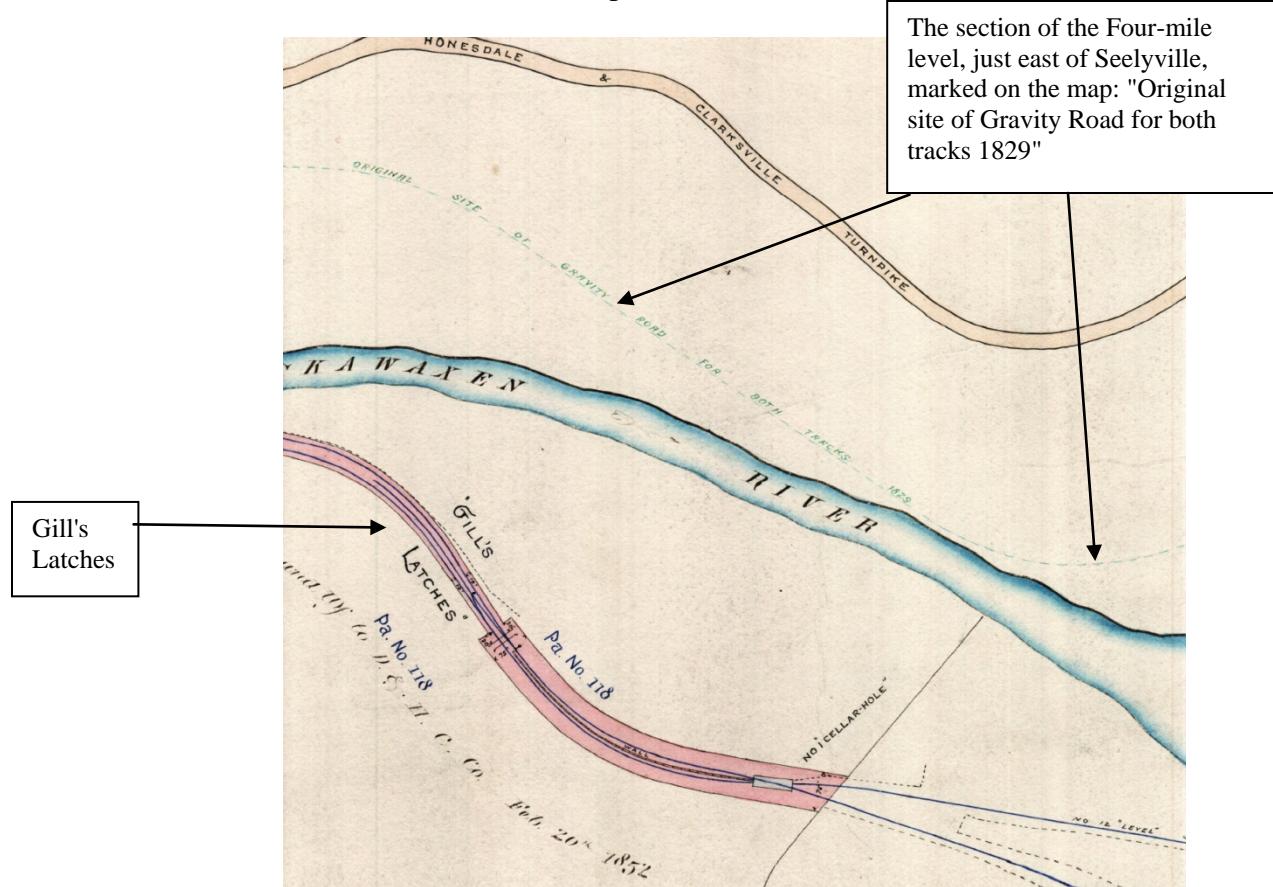


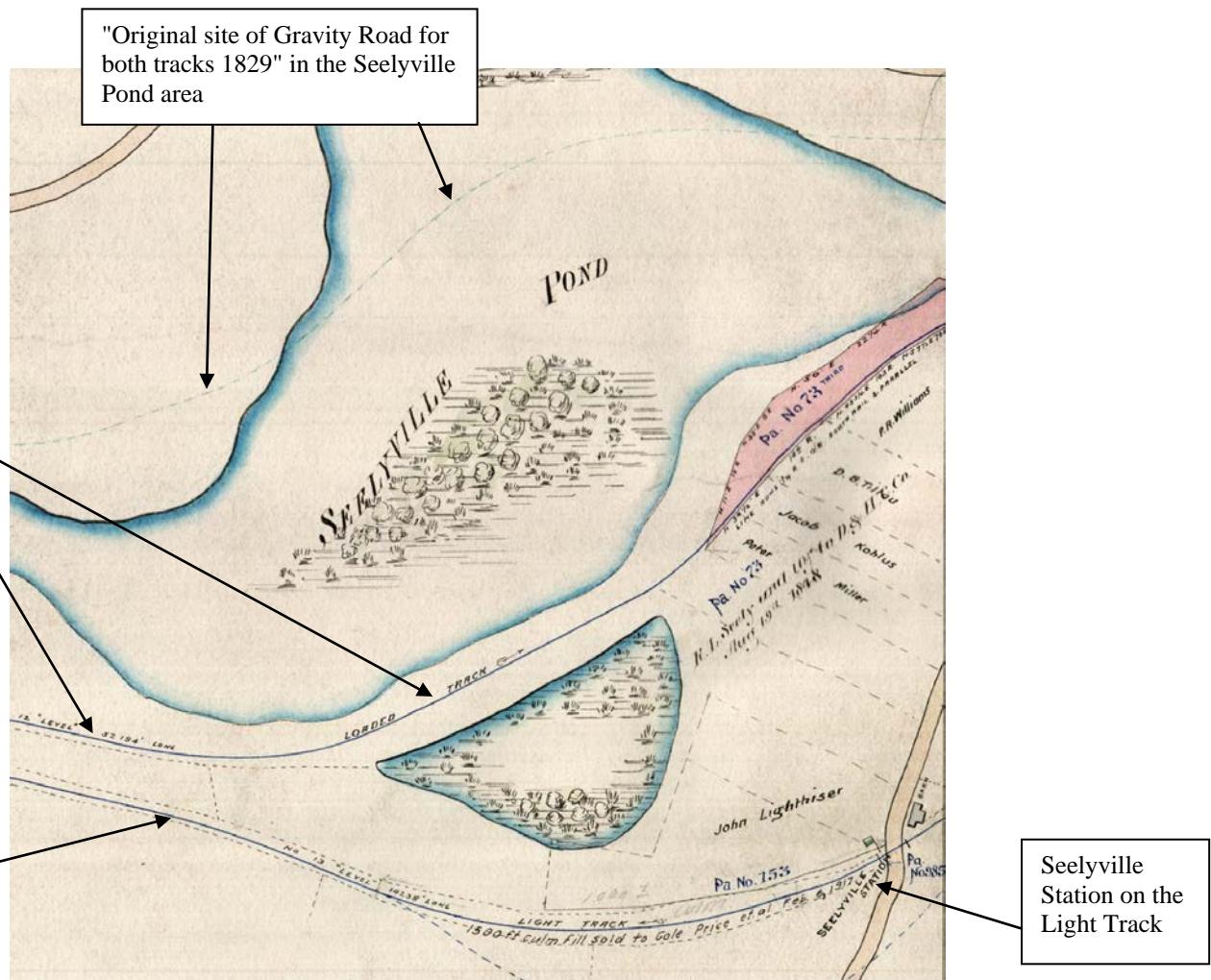
Four-mile Level (Level 3)

“From the foot of plane 8 was the ‘four-mile level’ extending to the canal basin in Honesdale, and descending 106 feet, or twenty-six and one-half feet per mile. / The track was constructed along, and near to, the northern, or left, bank of the west branch of the Lackawaxen, passing through what is now the Seelyville mill pond, along the northern side of, and very near to Seely’s saw mill, and the Fosters’ tannery buildings—and close along the river side of the turnpike across the Blandin flat, and from there to the basin near the site of the present track. / Near the Seely mansion at Seelyville the track passed under a bridge where the road to Cherry Ridge crossed it. This bridge was the point to which Horatio Allen run [sic] the Stourbridge Lion in his famous experiment on Aug. 8, 1829, the bridge being too low to permit the locomotive to pass under it.” (Torrey, 1882)

In the 1895 Gravity Railroad map volume, we see that the tracks on the four-mile level passed through a portion of Seelyville Pond.

Here is the relevant detail from that map:



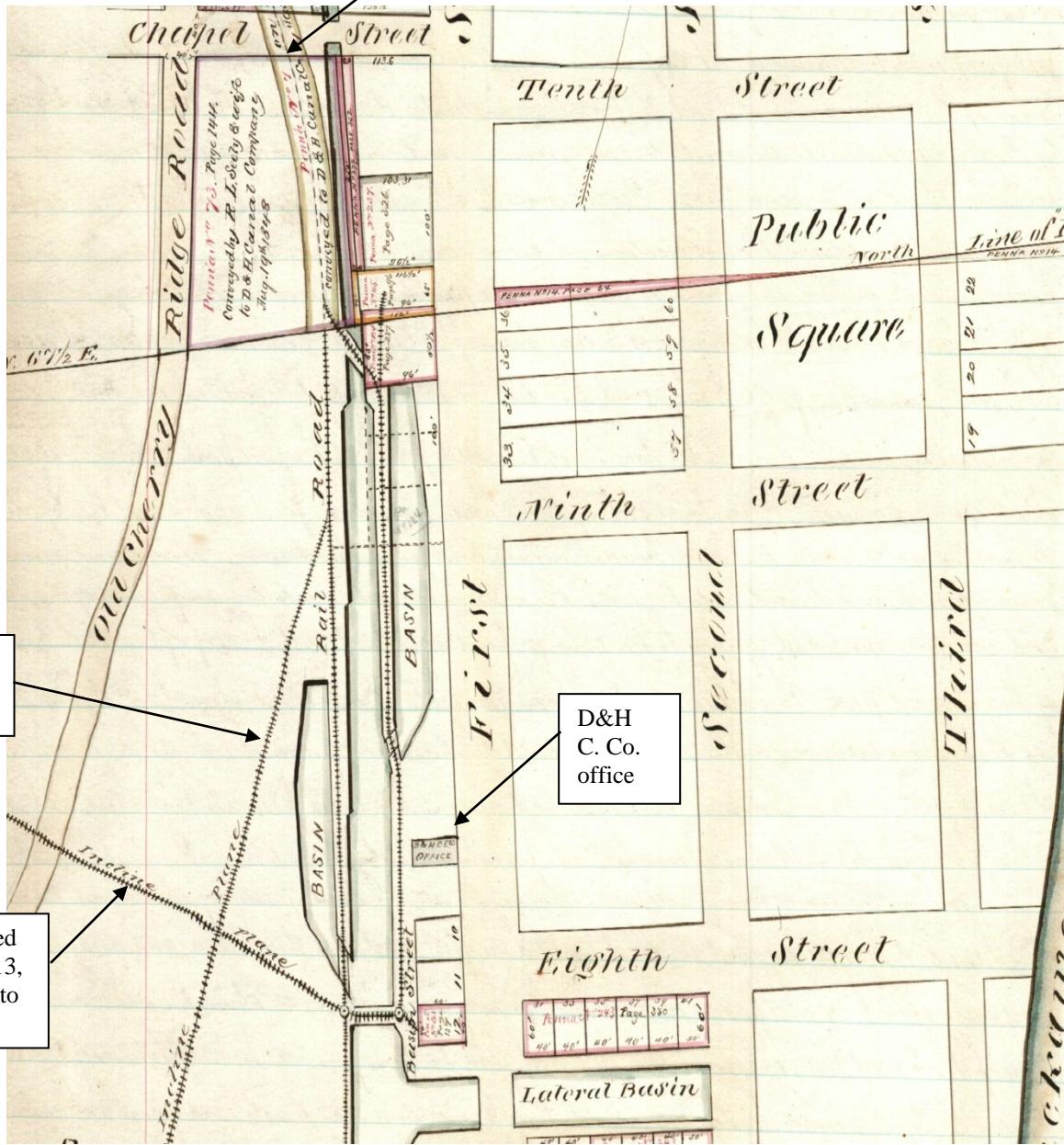


[The Levels] "It was originally expected to make use of locomotive power on the three long levels, known as 'summit level,' 'six mile level,' and 'four mile level,' and to use horses on the other levels between the planes. / Three locomotives were made for the company in England [emphasis added] under directions of Horatio Allen, and brought to New York to be so used, but on the trial of one of them, the track was found too weak to admit of their use with safety; and the use of horses was thus made necessary on those levels also. / On the summit level one horse could not draw more than two loaded cars at a time. On the six mile level, between Waymart and Prompton, the grade was such that loaded cars descended by gravity, and cars were provided with a sufficient number of horses to ride with each train to draw the empty cars back—one horse being thus able to return four empty cars. These horses became so accustomed to riding

down the grade that when, by reason of ice on the rails, the cars required force to propel them, some of the horses clearly showed an unwillingness to go upon the track and draw the cars in that direction. / On the four mile level, between Prompton and the canal basin, the grade was such that one horse could draw five loaded cars down, and the same number of empty cars back. / The four-mile and the six mile levels had each a branch or side track for a short distance, near the centre, so that cars moving in one direction could pass those going in the opposite direction, and at these branches were the boarding-houses for the car runners. One of these boarding houses was near the present residence of Jacob L. Keen, and was kept by Warren Dimock, and the other was opposite the present residence of Henry L. Phillips, and was kept by George M. Keen." (Torrey, 1882)

In the *D. & H. Deed Book – Wayne*, p. 80, there is a map that illustrates the deed, pp. 79-80, dated October 23, 1841, between Homer Grennell and wife and The Delaware & Hudson Canal Company. On that map a portion of the downtown Honesdale operations of the D. & H. are shown. Here is that map:

Loaded and Light tracks, 1829



Union loaded
plane, No. 12
1/2

D&H loaded
plane No. 13,
from 1843 to
1899

"We learn from the *Wayne County Herald*, that a son of Mr. Abram Pullis, about 16 years of age, on Thursday last met with a fatal accident on the Company's Railroad, at its termination in Honesdale. In attempting to leave a car, he missed his foothold, and was precipitated some 15 or 18 feet below, causing instant death." (*Carbondale Journal*, May 20, 1841, p. 2)

2949

The Junction of the Gravity Railroad and the Canal at Honesdale

Given the fact that real estate in the borough of Honesdale increased significantly in value in the course of the nineteenth century, it is interesting to examine the path by which the D&H acquired title to its substantial land holdings in Honesdale. Here is a succinct account by Mathews of what took place. On June 30, 1823, Samuel Kimble bought from Mordecai Roberts, Jr., of Dyberry Township, for the nominal sum of \$100, "all of the land embraced in the present [1886] borough limits, below, or south of, a line drawn east and west through the public square and extended a short distance on each side of the borough lines. / In 1825 he had partially cleared a few acres and erected a small plank house at a point on Second Street, as the town is now laid out and here was residing, in the first house erected upon the site of the now thriving and beautiful town, when the operations of the Delaware and Hudson Canal Company were begun. The projectors of that great enterprise were sufficiently far-sighted to anticipate that a town would be built up here, at the western terminus of their canal and the eastern terminus of their contemplated railroad over the mountains, and they were, as a matter of course, anxious to obtain possession of Kimble's land. It being represented to him by the company's gents that the canal basin would be located beyond the limits of his purchase and the passage of the canal through his farm would be very detrimental to his interests, and also being advised by some of his friends to sell, he finally, on the 19th of September, 1827, conveyed to Maurice Wurts, of Philadelphia, all of his land lying west of the Lackawaxen, comprising 'one hundred and seven acres, fifty-nine perches strict measure,' Kimble reserving the right to maintain a dam across the river. The consideration was one thousand dollars in cash, a sum which seemed so small when active operations had been begun on the lands he disposed of and their true value was foreshown, that Kimble bitterly repented the transaction. On the 15th of October, 1827, Maurice Wurts sold the parcel of land to 'the President, Managers and Company of the Delaware and Hudson Canal Company,' for the sum of four thousand dollars. By them it was laid out in building lots (except such portions as they reserved for their own use), and from that company all titles to lots in Honesdale, south of the line heretofore referred to, have been accordingly derived." (Mathews, p. 339)

Jason Torrey's expectation that the head of the D&H canal would be located on his land never became a reality. Rather, the head of the canal was on land south of Torrey's. Here is what Mathews has to say on the question: "BEGINNING OF THE TOWN.—As soon as it became apparent that the 'Forks of the Dyberry' was to be the terminus of the canal, operations were begun for the building of a town. It appears that for a time it was Jason Torrey's expectation that the head of the canal would be located upon his land, and that he and the company should co-operate in laying out the town. Indeed, a contract to that effect was entered into between Mr. Bolton, the president of the company, and himself, which only needed ratification by the board of directors. They failed to approve it. The head of the canal was fixed on the lands south of Mr.

Torrey's, which, as heretofore stated, had been bought by Mr. Wurts and conveyed to the company, and hence each of the parties began separate improvements, and two distinct hamlets came into existence, which were not merged for many years." (*Mathews*, p. 340)

From then on (after 1827), we learn from *Mathews*, the "Forks of the Dyberry" grew rapidly.

"From this time on [1827] improvements were carried forward with something like a rush, for gangs of men were set to work by the canal company, and tradesmen and citizens began to flock to the place. Speaking of a period a little later, the Rev. Henry A. Rowland [in a Thanksgiving sermon in 1851] thus pictures the prosperity which the great work of internal improvement brought to the locality and surrounding country,-- 'The work was completed; coal began to float down the canal towards the sea-coast and a tide of immigration to set back through the same channel into this almost wilderness. Laborers, mechanics, and merchants flocked in and established themselves along the line of the public work; and when those who had gained something from their industry preferred a different life, they purchased wild lands, subdued them by the plow and devoted themselves to agricultural pursuits.' " (*Mathews*, pp. 340-41)

The D&H Canal was built between 1825 and 1828. In the December 18, 1828 issue of the *Dundaff Republican*, we read:

"We have the pleasure to state, that the Delaware and Hudson Canal, is now in successful operation, between Honesdale and its junction with the Hudson. / It is expected that the Rail Road from Honesdale to Carbondale, (at the Coal Mines) a distance of 16 miles, will be in successful operation early in the Spring." [emphasis added by SRP] (*Dundaff Republican*, December 18, 1828, p. 3)

In 1829, a dozen canal boats were sufficient to carry to market the 7,000 tons of coal delivered to Honesdale by the Gravity Railroad; in 1830, six times that number of boats were in use; in 1833, 300 boats. Here are the tonnages of coal shipped through the canal for the first ten years of its operation: 1829, 7,000; 1830, 43,000; 1831, 54,000; 1832, 84,000; 1833, 111,777; 1834, 43,700; 1835, 98,845; 1836, 104,500; 1837, 115,387; 1838, 76,231.

The taxable residents of Honesdale for the period 1827-29 were as follows:

1827: Daniel Blandin, Charles Forbes, Stephen W. Genung

1828: Alanson Blood, Jacob B. Bidwell, James L. Blackington, John Capron, Isaac P., Foster, Leonard Graves, Thomas T. Hayes, Edward Mills, Hiram Plum, John F. Roe, Zenas Russell, Russell Spencer, Timothy N. Vail, Russell Whitney

1829: Horace Baldwin, Simeon S. Chamberlain, Calvin Earle, Nathaniel B. Eldred, Henry Herington, Stephen Kelly, Martin Kellogg, Solomon Z. Lord, Ebenezer T. Losey, William Moak, John Osborne, Benjamin Rouse, Mary Stewart (widow), Abraham J. Stryker, Stephen Torrey, Daniel B. Wilcox, Joseph B. Walton

Other early arrivals in Honesdale were:

--John Kelly, a native of Ireland, arrived in 1828, and went immediately into the service of the Delaware & Hudson Canal Company, in whose employ he remained for thirty-two years

--Thomas H. R. Tracey, arrived in 1829. Soon after coming to Honesdale, he was appointed superintendent of the Pennsylvania section of the D&H Canal, a post which he occupied until his death on May 4, 1856

--Russel F. Lord was one of the early comers and one of the original engineers and managers of the Delaware and Hudson Canal Company. His brother, Solomon Z., long in the employ of the company at Hawley, was contemporary in arrival.

--Edward Murray emigrated to America in 1809. He came to Honesdale when the town was in its infancy. He helped to complete the Delaware and Hudson Canal, and immediately upon its completion commenced boating, and thus was one of its pioneer boatmen.

The village of Honesdale was incorporated as a borough under an act passed January 23, 1831.

In the summer of 1841 Washington Irving visited Honesdale in company with the Directors of the Delaware and Hudson Canal Company, among whom were his friends Philip Hone and Mr. Brevoort.

This was the Directors' annual visit of examination. They visited a shady avenue (an old abandoned turnpike which passed along the east side the Dyberry Creek and what is through what is now Glen Dyberry Cemetery) which was named Ladywood Lane by Washington Irving. Philip Hone suggested that the rugged and picturesque cliff rising 318 feet above the Lackawaxen River be known as Irving's Cliff. They were taken on a buggy ride around Honesdale and up to Bethany.

2950

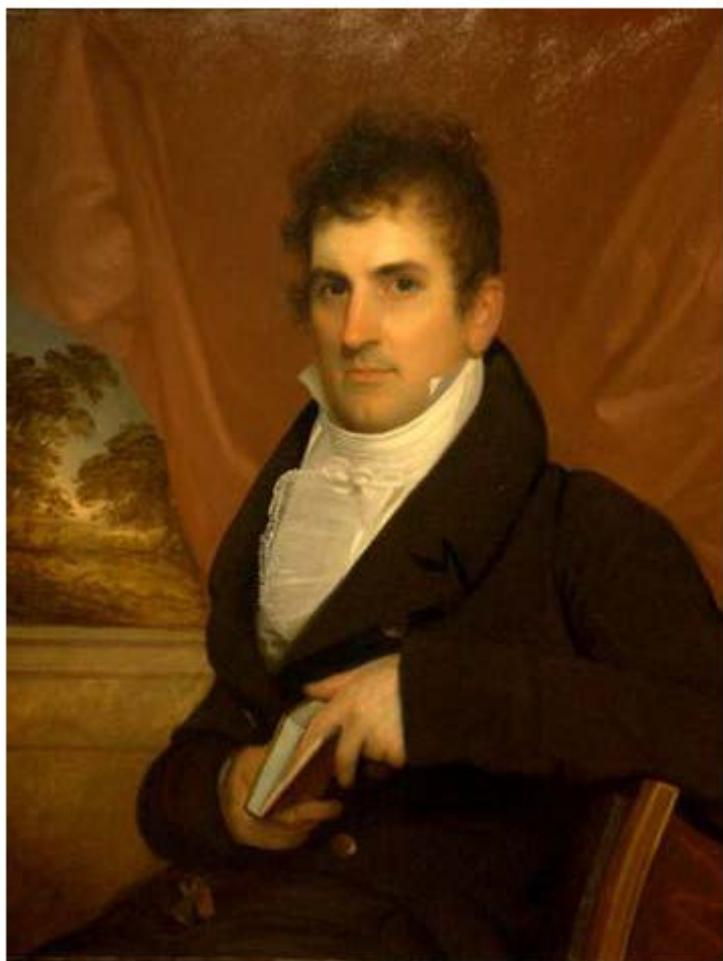
Philip Hone

Honesdale, it goes almost without saying, was named after Philip Hone, the first president of the Delaware and Hudson Canal Company. (There is also a Hone Avenue in the Bronx, NYC, NY.)

Here are a few facts about the man.

Philip Hone was born October 25, 1780, and died May 5, 1851. His earthly remains are buried at Saint Mark's Church in the Bowery, NYC. Philip Hone, the son of a German immigrant carpenter, was a successful merchant and became wealthy in the auction business. He was a founder of the Mercantile Library Association.

He was the first president of the Delaware and Hudson Canal Company, 1825-1826. In 1826, he was elected the 57th Mayor of New York City on the Whig ticket, and served one term, 1826-1827.



Philip Hone, oil on canvas, by John Wesley Jervis,
1809. DeYoung Museum.

In 1827 he was elected into the National Academy of Design as an Honorary Academician. During the Zachary Taylor administration he served as Naval Officer of the Port of New York.

Hone kept a diary from 1828 to 1851. It records not only his society engagements and the major events and spectacles in the city in the first half of the century, but also his view of a changing city: his disapproval of Andrew Jackson; the disconcerting effects of the city's constant construction; and his utter disgust with most Irish immigrants.

He was prominent in New York society because of his wealth, sophistication, extensive travel, and good taste. Among his friends were Samuel F. B. Morse, Daniel Webster, John Jacob Astor, John Quincy Adams, and Martin Van Buren.

At the time of his death, Philip Hone was U. S. Naval officer for the port and district of New York. His New York residence was at 235 Broadway, opposite City Hall Park. The site was later one of those purchased by F. W. Woolworth for construction of the Woolworth Building. In October 1837, he moved to the corner of Great Jones Street and Broadway.

Philip Hone saves the D. & H. C. Co.:

From October 9, 1829 to the close of the season that year, the D&H sent 7,000 tons of coal to market. Some of that coal was surface coal, the quality of which was not first class, and the company came under attack for its coal of inferior quality, and the D. &H. C. Co. came very close to going out of business in 1830. Had it not been for Philip Hone it probably would have.

Consider the following account from the unpublished manuscript of Hollister (pp. 45-46):

"First impressions, especially if unfavorable are difficult to overcome. The Delaware and Hudson Canal Company early felt the force of this truth. In 1830 they had to encounter a prejudice created by the acknowledged inferior character of the surface coal carried to market from their Carbondale mines. It made the coal trade dull and rendered Lackawanna Coal unpopular from the start. Rival coal operators from the Lehigh, with their bright anthracite easily mined, jealous of the young coal works upon the head waters of the Lackawanna, now sought to crush them out by plausible stories of the worthlessness of the coal, the perishable character of the road and canal and the probable early bankruptcy of the Company. The Company became sadly embarrassed, and all hopes of a dividend thwarted for the time. More than this, the cry of the monopoly was arrayed against it, at a time when the shares, first costing \$100 each, had been six or seven years on the hands of the stockholders without yielding a single dividend, and had therefore in effect, cost about \$140 per share, could actually be bought in the market at the time for about \$48 to \$50 per share, or half what it had already cost. / Apprehension took the place of hope and the dissolution of the Company was only averted by a noble act of Philip Hone, of New York. This gentleman distinguished as the courtliest Mayor ever seen in New York, was the firm friend and aider of the coal enterprise, had filled the position of presidency without a whisper of reproach upon his administration, and had given a name to the fruitful glen of the Dyberry where Honesdale perpetuates its remembrance. With Messrs. Wurts, Holmes, Talbet, Tileston, Post

Halstead, Calder, Bryan, Chancellor Kent and other managers, he was called to attend an urgent Meeting on Sunday at the old City Hotel to determine whether the Company could go on or stop forthwith. After a calm deliberation and discussion it was decided that the Company must close its door the next morning even if it would bring ruin to the stockholders and send a thrill of terror along the line of Canal and railroad hitherto comparatively prosperous. When Mr. Hone reached home he reflected upon the distress the failure would bring upon widows and orphans who had been led perhaps by the appearance of his name among the Managers to invest in its stock. This reflection so preyed upon his sensitive organization during the night that the next morning before ten o'clock he raised the whole sum needed to save the Company and handed it to the President without security. / The year 1831 did not open auspiciously. The credit of the Company was again fearfully depressed and the sale of coal was insufficient to advance its credit or sustain its expense. . . Maurice Wurts who had superintended the construction of the Canal had resigned upon its completion. He again undertook the Superintends of an important Department of the Company's business, while his brother John a prominent lawyer of Philadelphia and Member of Congress, was elected President. / The first business of the Board after the election of Officers and Managers in 1831 was to dispel the error into which the public had been led by the unfair and unfortunate specimen of Lackawanna Coal taken to New York in 1829."

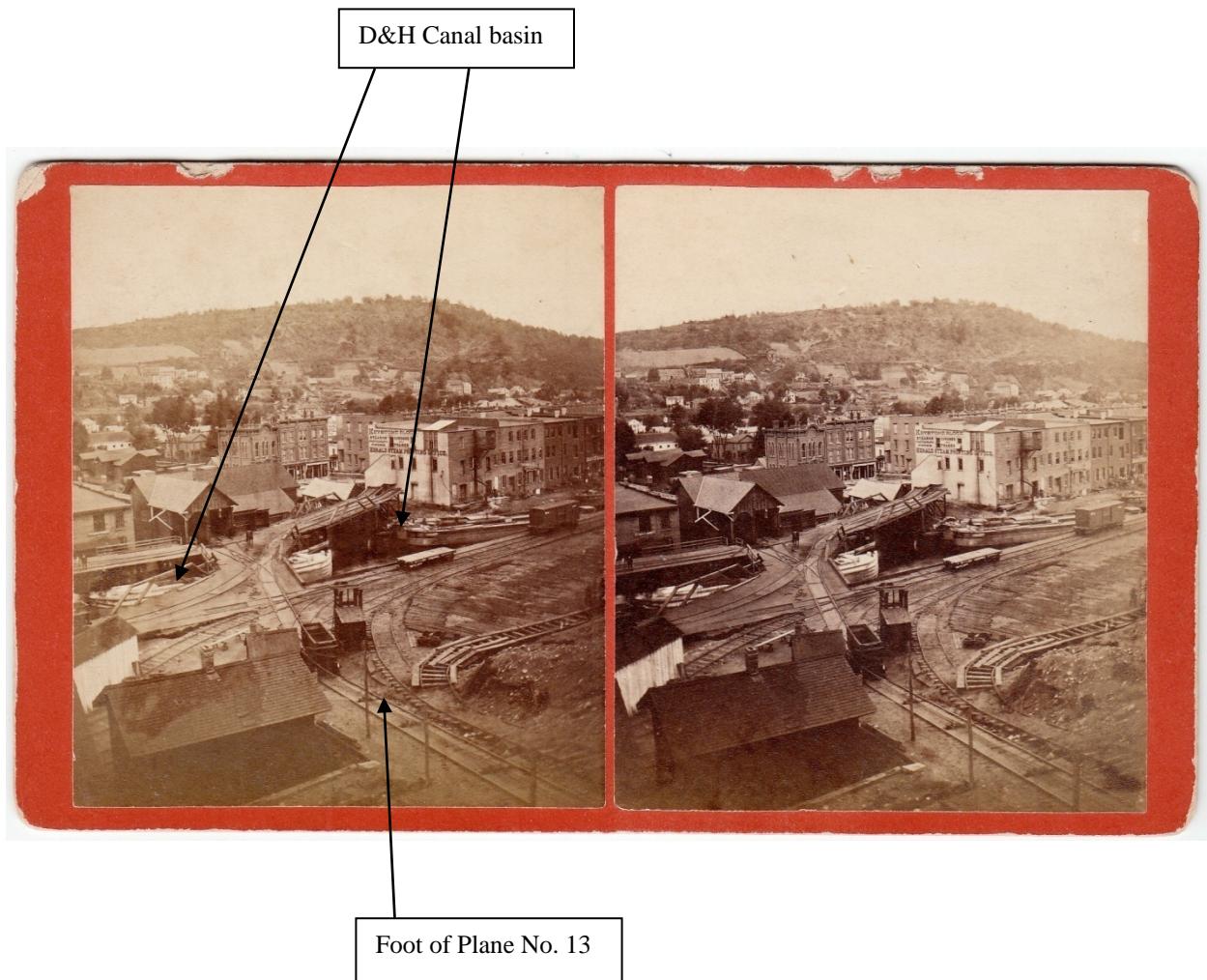
An interesting observation from Hollister:

Hollister, p. 196: "Much of the brain power [behind the D&HC Co.] was Pennsylvanian; most of the money entering into the Delaware and Hudson Canal Company first and last emanated from the Empire State. Thus conceived by men of one State and vitalized by those from another much of its present management and inspiration comes from Pennsylvania."

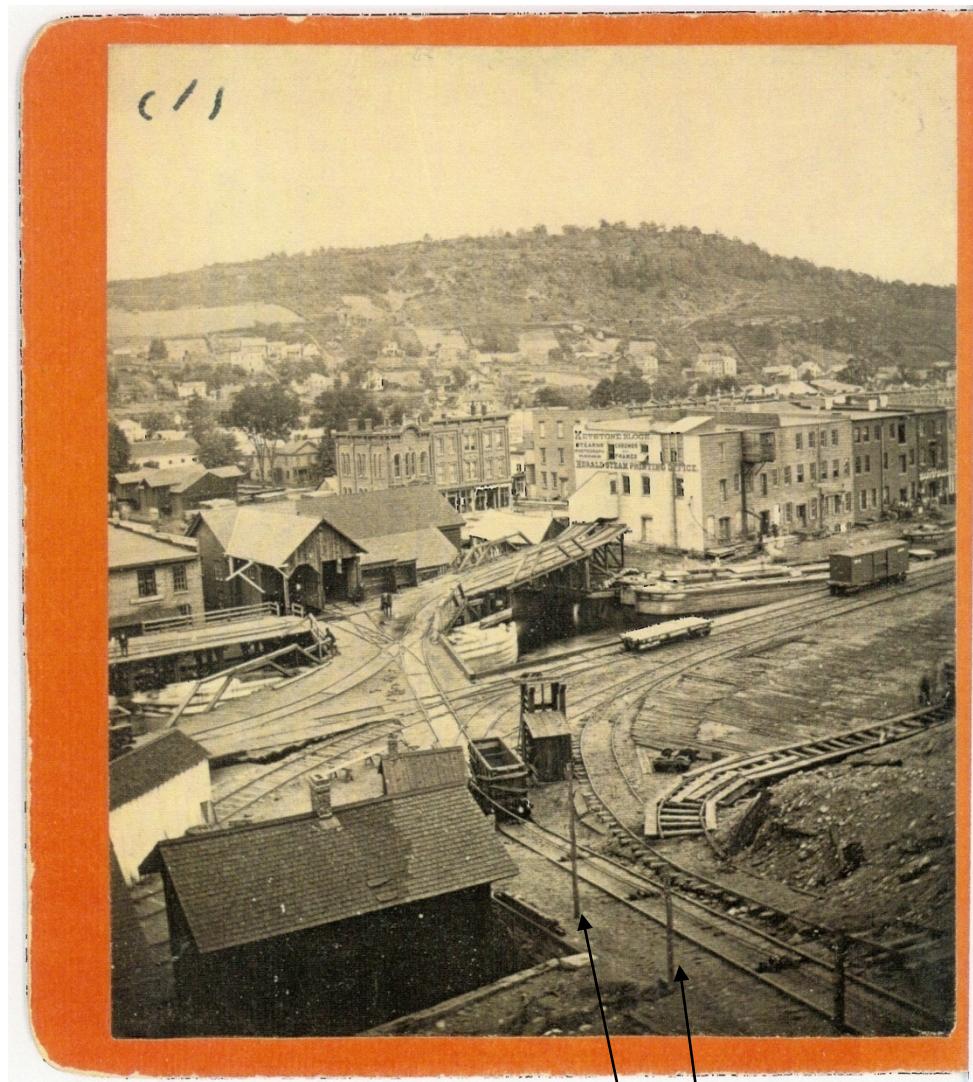
Hensel Photographs of Gravity Railroad and Canal Operations at Honesdale

Photographs of the junction of the Gravity Railroad and the D&H Canal at Honesdale during the first thirty years of operation of the D&H system are extremely rare, perhaps non-existent. What we will show here are a series of stereographic views of Honesdale and railroad/canal operations there that were taken by Ludolph Hensel in the 1870s and later.

Hensel No. 921: *Terminus of D & H RR, and D. & H. Canal*

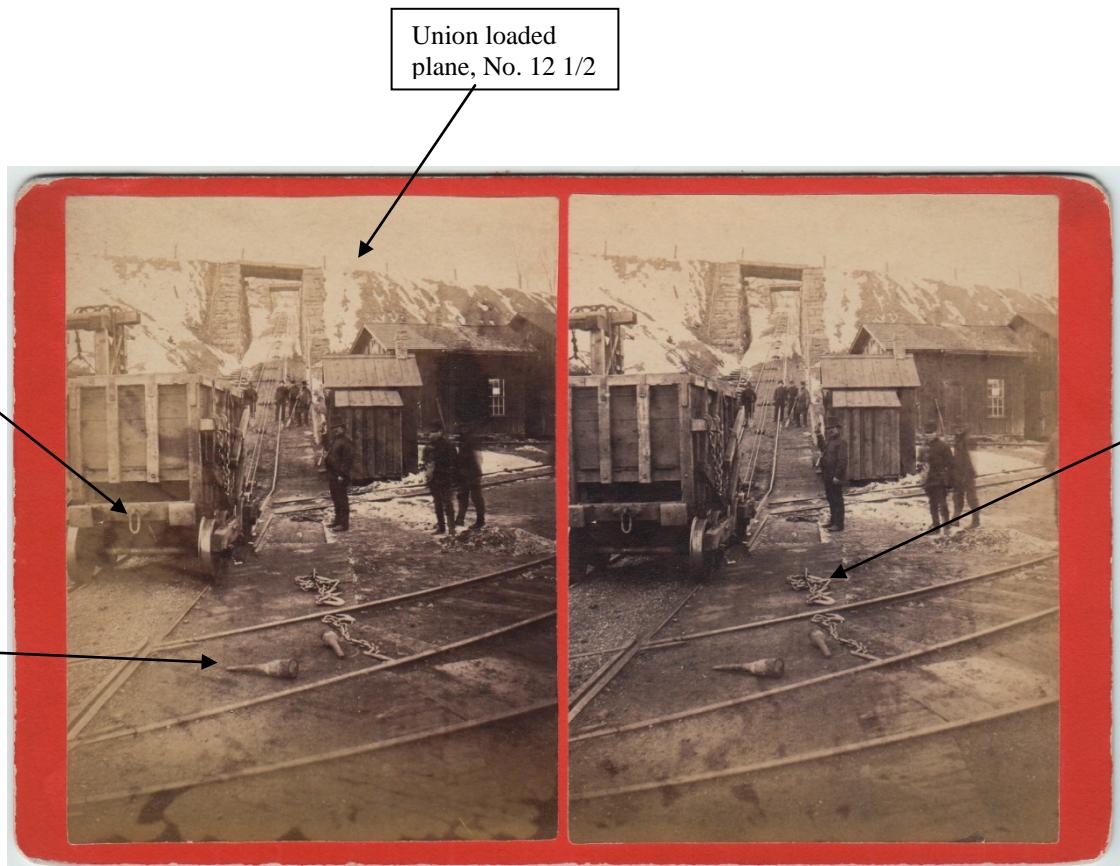


Another copy of one-half of Hensel No. 921 (shown above):

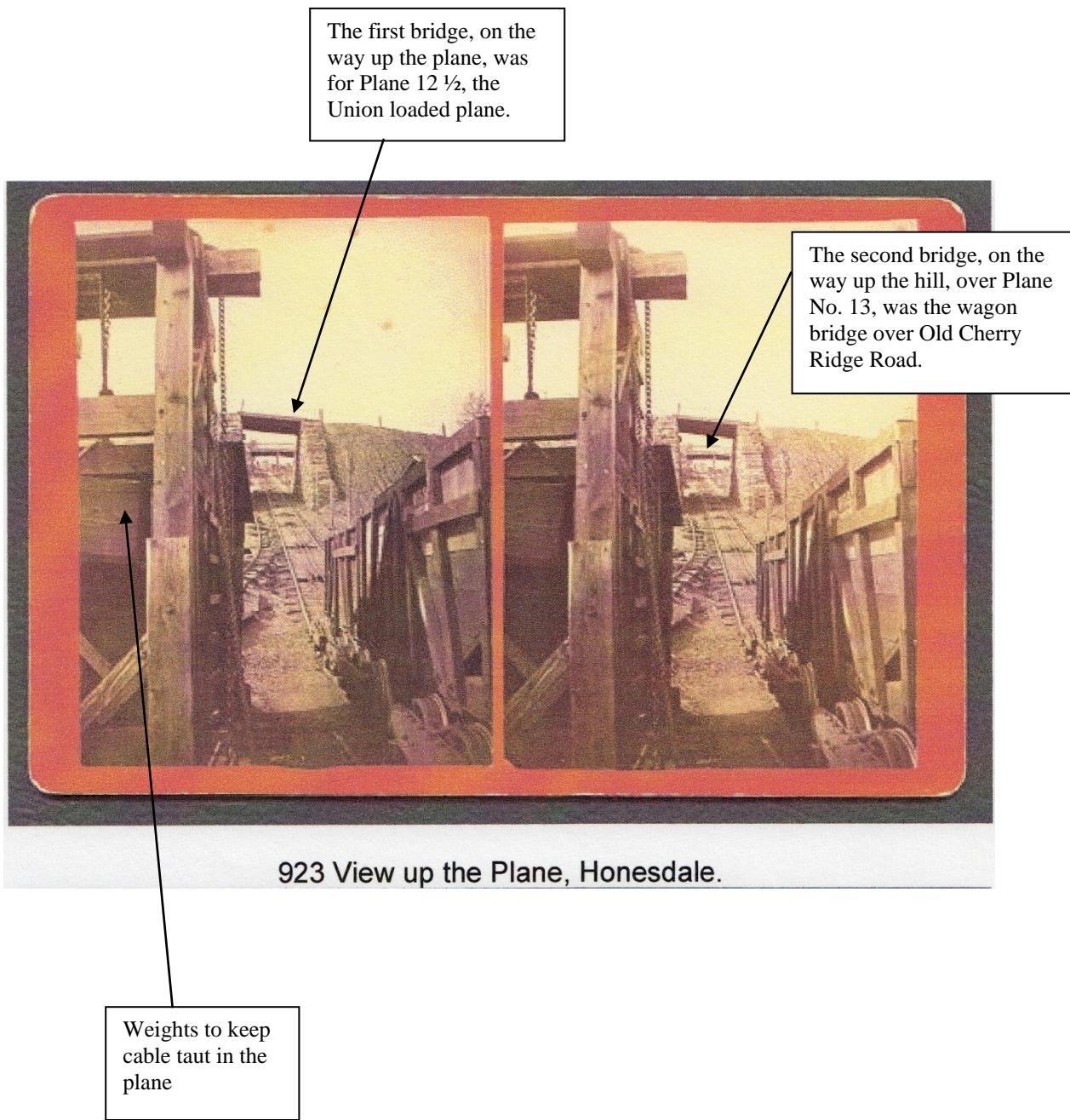


Posts along side
the plane for the
bell wire

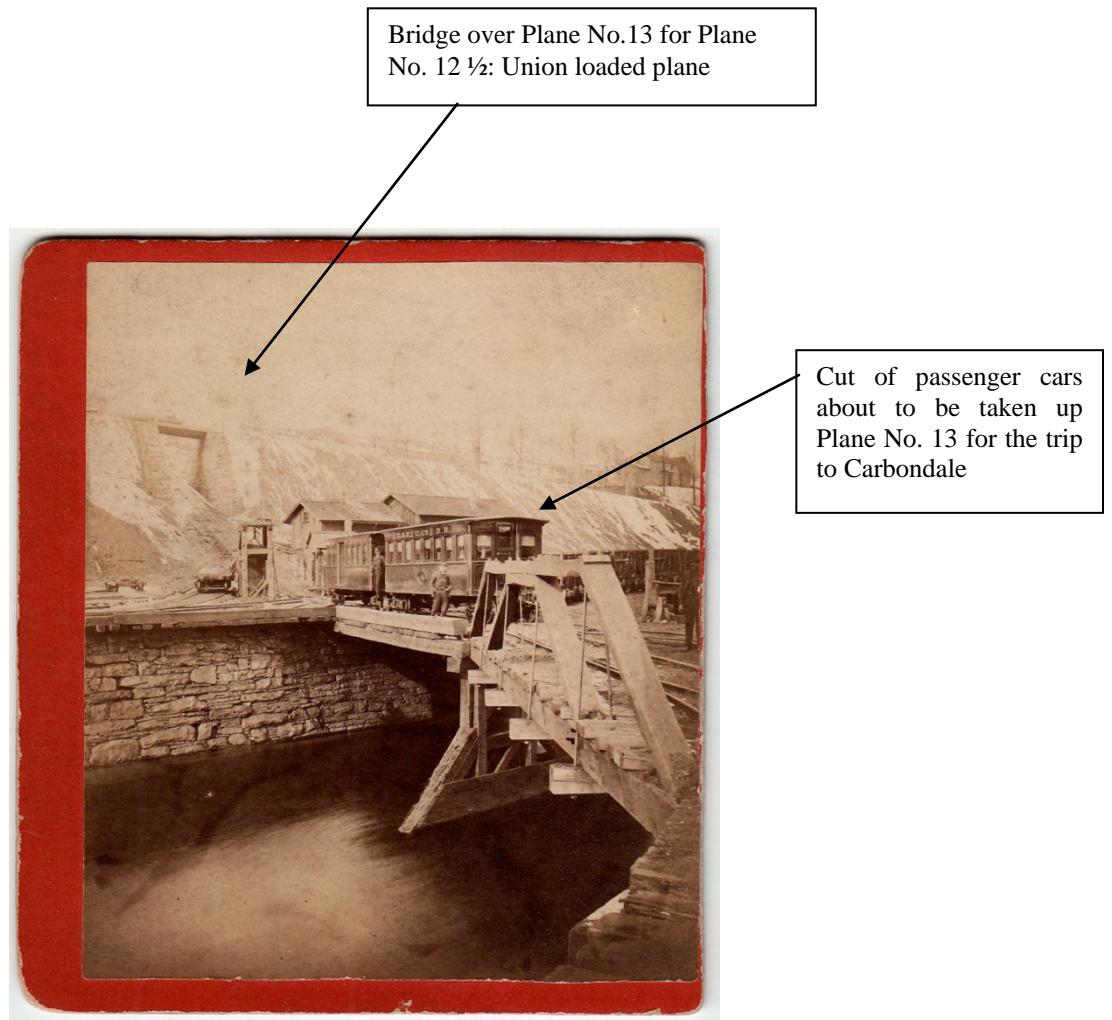
Hensel No. 923: *View Up the Plane [D&H No. 13], Honesdale*



Here is another of the three *Views Up the Plane* [D&H No. 13], Honesdale (numbered 922, 923, 924) that were taken Hensel.



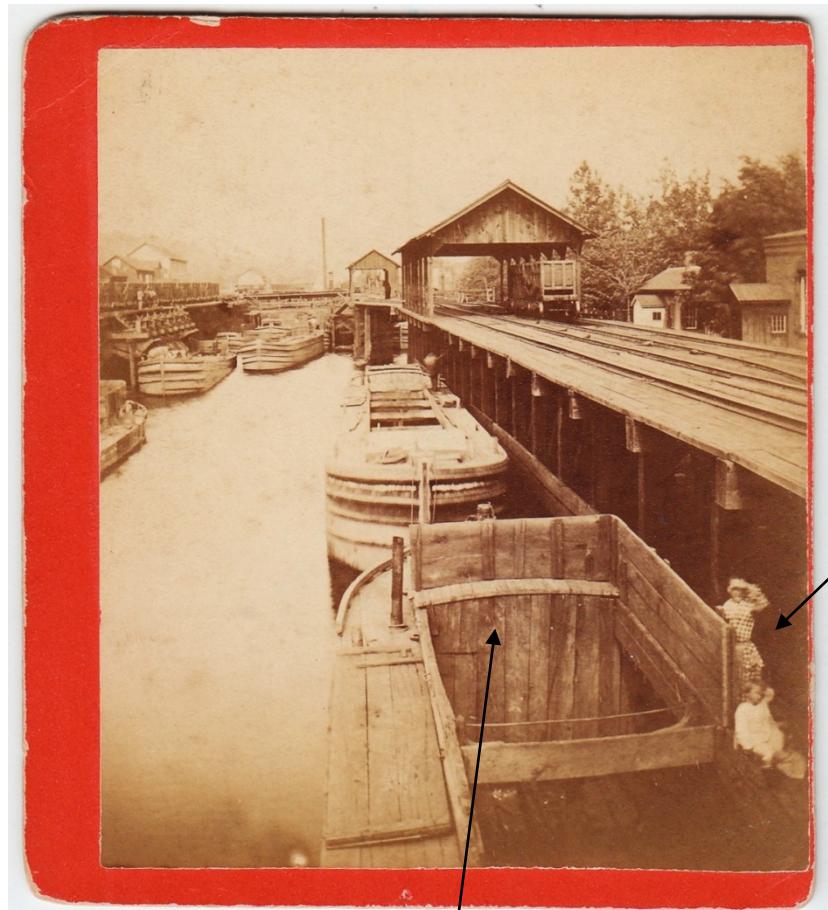
Hensel No. 924: *View up the Plane [D&H No. 13], Honesdale*



Hensel No. 925: *Starting Point of D. & H. Canal, Honesdale*

Canal boats in the canal at Honesdale.

View looking West



A "hipped" canal boat

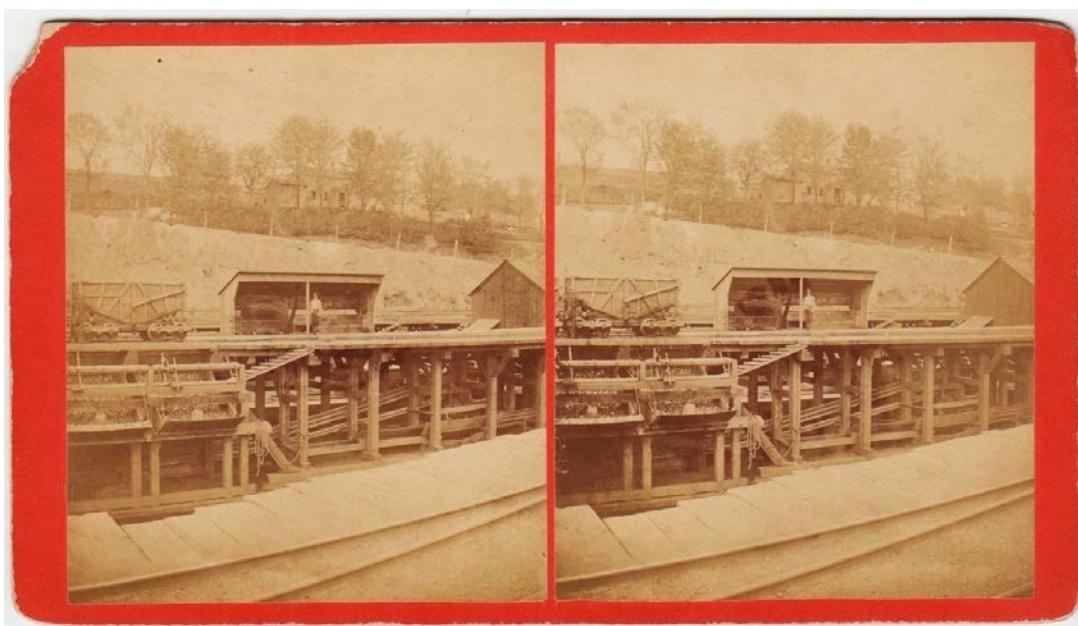
Members of a canal boat family watching Hensel take this photograph of the upper Honesdale basin.

Two stereo card D&H Canal scenes, by an unidentified photographer, quite possibly Hensel. Originals in the collection of the Carbondale Historical Society.

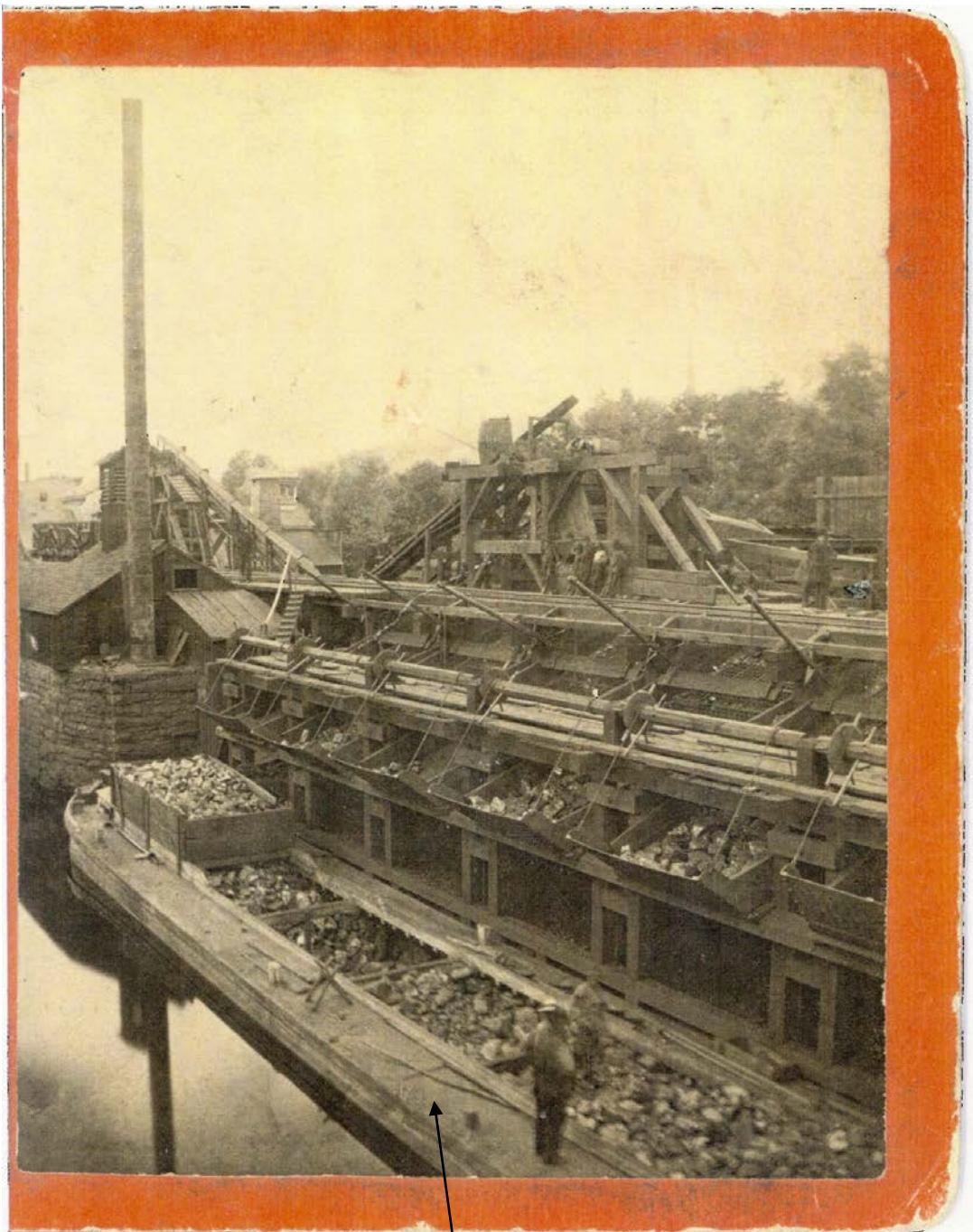
Canal Scene, Honesdale. Photographer unidentified. View looking East. Main Street in Honesdale is to the left of this scene.



Coal loading facilities at Honesdale along the canal. Main Street, Honesdale, is behind the photographer.



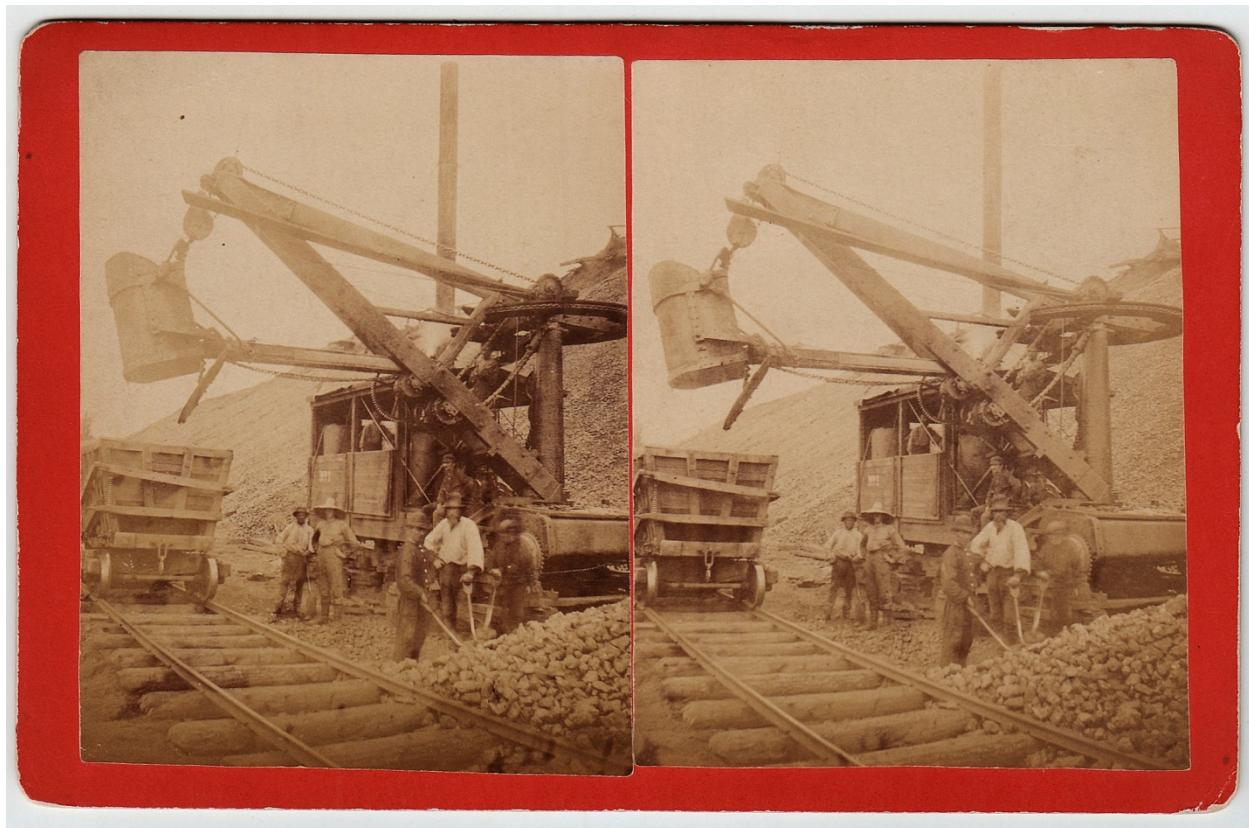
Hensel No. 974: Coal Screens on Del. & Hud. Canal Docks



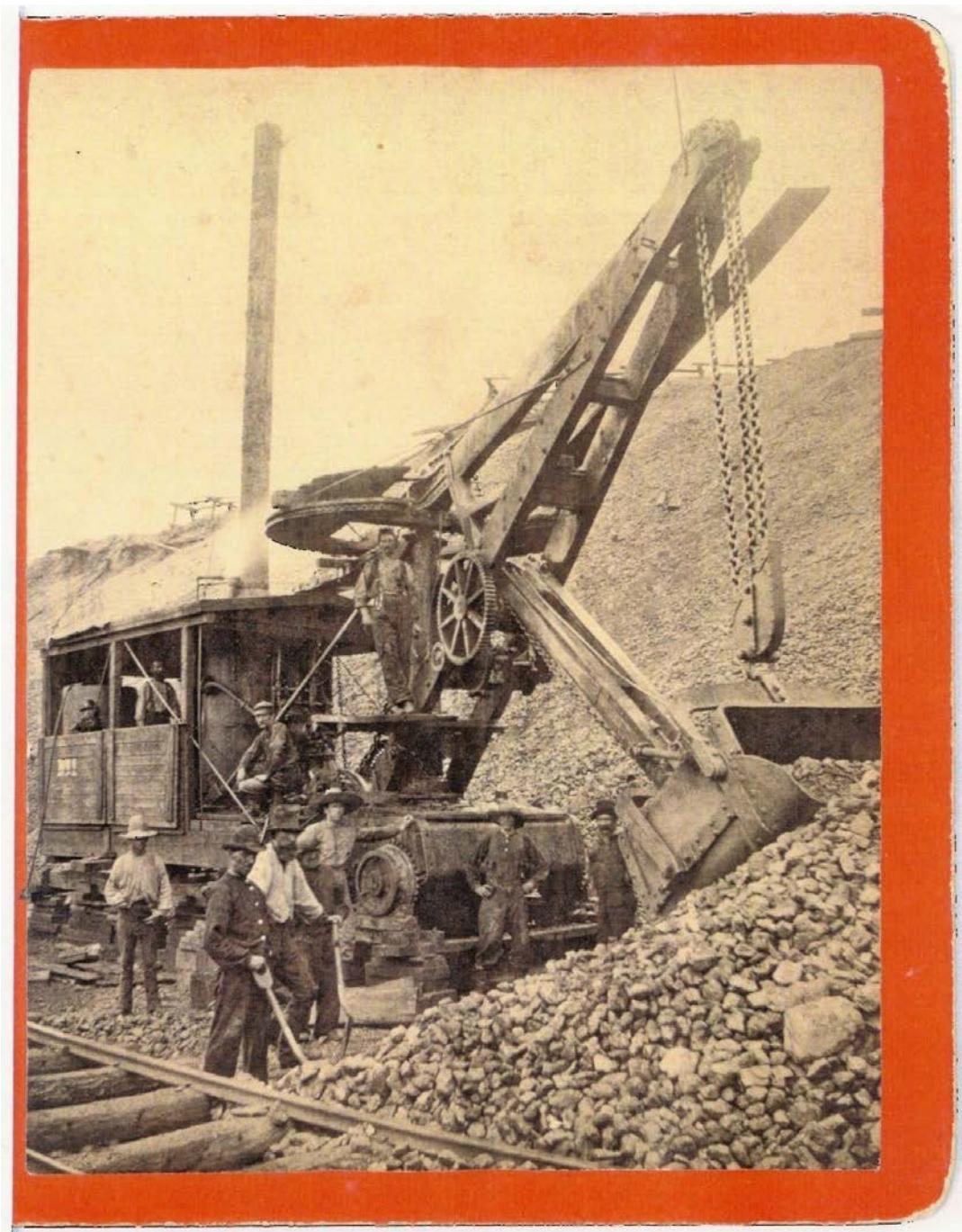
A hipped boat

"Views Along The Honesdale Branch of the New York, Lake Erie & Western Railroad,
Photographed and Published by L. Hensel, Port Jervis, N.Y."

No. 976: *Steam Coal Shovel on the D. & H. Canal Docks*



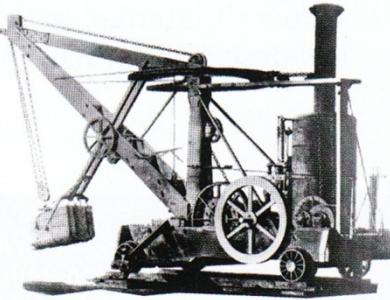
No. 977: Steam Coal Shovel on the D. & H. Canal Docks



There is a striking similarity between the 1841 steam shovel shown below designed by William Otis and the steam shovel used by the D&H on its coal docks at Honesdale, shown above. To date, nothing is known about the D&H steam shovel. Was it made by the D&H, based on an Otis design? Was it purchased by the D&H?

170 YEARS AGO DIGGING IT

American inventor William Otis, 25, patents the first steam shovel on February 24, 1839. He dies later that year of typhoid. Otis, a contractor, had designed the machine in 1835 (below: an 1841 version) while building a Massachusetts railroad. A steam-powered chain hoist raises and lowers the bucket, which can also be moved from side to side. Immigrant labor keeps hand-shoveling cheap for a time, but by the 1870s steam shovels are a force behind America's westward expansion and mining operations, and, in the early 1900s, the Panama Canal. ◎



FEBRUARY 2009 SMITHSONIAN 9

In March 1865, the dam at Keen's Pond went out and the Lackawaxen and the Dyberry went up two feet and cellars in the lower part of Honesdale were flooded. The Honesdale floods of 1902 and 1942 were much worse/more disastrous.

2952

Gravity Engines Moving Coal on the D&H Canal Docks at Honesdale

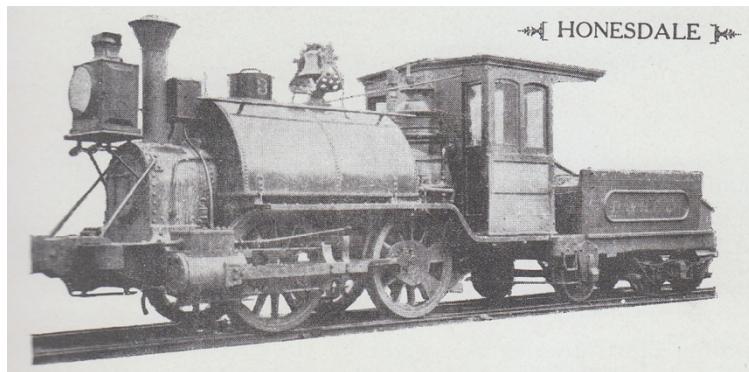
There were five Gravity-gauge steam locomotives, the first four of which (*Major Sykes, C. P. Wurts, Honesdale, Lackawanna*) saw service, for varying periods of time, at the foot of Plane 23 in Olyphant. Two of those engines (*Honesdale and Lackawanna*) were used on the level ground at the head of the D&H Canal in Honesdale. This is an interesting transitional development in railroad technology: Gravity-gauge tracks, not on inclined planes or levels but on flat ground. Cars moved by a Gravity-gauge steam locomotive.

1. D&H Engine No. 1: *Major Sykes*: 0-4-0, built in 1860 by W. Cook & Co., Scranton. Valley Road Summary: ". . . the first locomotive built for the Delaware & Hudson company's use on this side [the West] side of the mountain. . . This engine was built . . . to haul coal from the Von Storch and Richmond breakers—the only ones then in operation—to the foot of plane 23, Olyphant. Henry Cool, who now runs a locomotive on the New York Central, was the first engineer to work her."
2. D&H Engine No. 2: *C. P. Wurts*: 4-4-0, built in 1860 by W. Cook & Co., Scranton. Sold to the Dickson Locomotive Works in 1874. Valley Road Summary: ". . . [C. P. Wurts] built for passenger service, though she too hauled coal to the foot of No. 23 when necessary."
3. D&H Engine No. 3: *Terrapin* (name later changed to *Col. Ellsworth*, then to *Fire Plume*, then to *Honesdale*), 0-4-0, built in 1861 by W. Cook & Co., Scranton. Retired 1899. Valley Road Summary: ". . . [Honesdale] now doing duty on the company's docks in Honesdale. . . She was too small for the work at Olyphant, and was kept there only a short time."

Honesdale

0-4-0 type, built by W. Cook and Company, Scranton, in 1861. This particular locomotive had three different names over the years, the 'Terrapin,' 'Fine Plume' and 'Honesdale.'

Photo from *Railroadians*. . . , p. 31:



The photo shown below of the *Honesdale* was downloaded from a JVB e-mail. The *Honesdale* is said to be seen here at the canal basin in Honesdale.



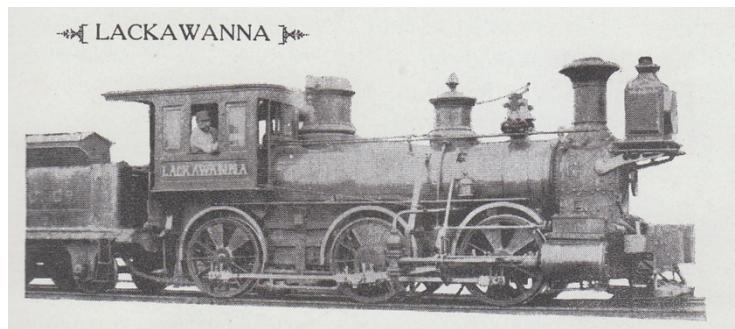
4. D&H Engine No. 4: *Lackawanna*: 0-6-0, built in 1862 by the Dickson Locomotive Works, scrapped in 1899. Valley Road Summary: ". . . [Lackawanna] built for use between Olyphant and the mines. She also was sent to Honesdale, and is still there. All of the engines built prior to the extension of the [D&H] line to Vine Street, Scranton, in 1863, were transported from the Dickson works to Providence on heavy wagons, drawn by horses and mules."

D&H Engine No. 4, *Lackawanna*

"Coal was unloaded all winter long [at Honesdale] on the 'contract,' as the hillside above the canal basin was called, to be reloaded during the summer and hauled to the docks from whence it was shipped to market in canal boats. / It was during his time [Howard Fitch, late 1860s and early 1870s] that the locomotive *Lackawanna*, No. 4, was taken to Honesdale for use in handling

the coal between the storage piles and the transfer pockets in the north end of the yard, a distance of about a half-mile. David McDermott was the engineer. The engine was a hard coal burner and was used only in summer, being taken back to Carbondale each fall before winter weather set in. . . " When the Gravity Railroad was closed, Howard Fitch was working as the engineer at No. 15, at Prompton, on the light track. (Biographical portrait of Howard Fitch, pp. 279-280, *The Delaware and Hudson Company Bulletin*, September 15, 1927)

Photo from *Railroadians*. . . , p. 31:



The *Lackawanna* was built by the Dickson Manufacturing Company, March 31, 1862, serial number 'O,' type 0-6-0, having twelve by eighteen inch cylinders, forty-two inch drivers, fuel being anthracite. Boiler diameter was thirty-six inches. Total weight of engine was forty-two thousands pounds.

5. D&H Engine No. 5: *I. N. Seymour*: 4-4-0, built by the New Jersey Locomotive and Machine Co. in 1866. Blew up on March 10, 1879 in the Carbondale Roundhouse; sold to the Dickson Locomotive Works. Valley Road Summary: "On Sunday, August 4th, 1866, engine no. 5, named 'I. N. Seymour,' was delivered to the Delaware & Hudson by the Grant locomotive Works, Paterson, N. J.; she blew up in the Carbondale roundhouse in 1876. A locomotive at the time, cost from \$13,000 to \$18,000."

Locomotive and Gravity cars (in a photograph in the archives of the Wayne County Historical Society) at the canal basin in Honesdale. Which locomotive is this?



2953

**The D&H Canal in Honesdale, as Seen in 1895 Gravity Railroad Map Volume
(6 Views)**

We will present here a series of views of the D&H canal operations in Honesdale that are shown on the 1895 map of the Gravity Railroad that was produced by the D&H when the canal and railroad were still in operation. This D&H map volume is in the collection of the Lackawanna County Historical Society, Scranton, PA.

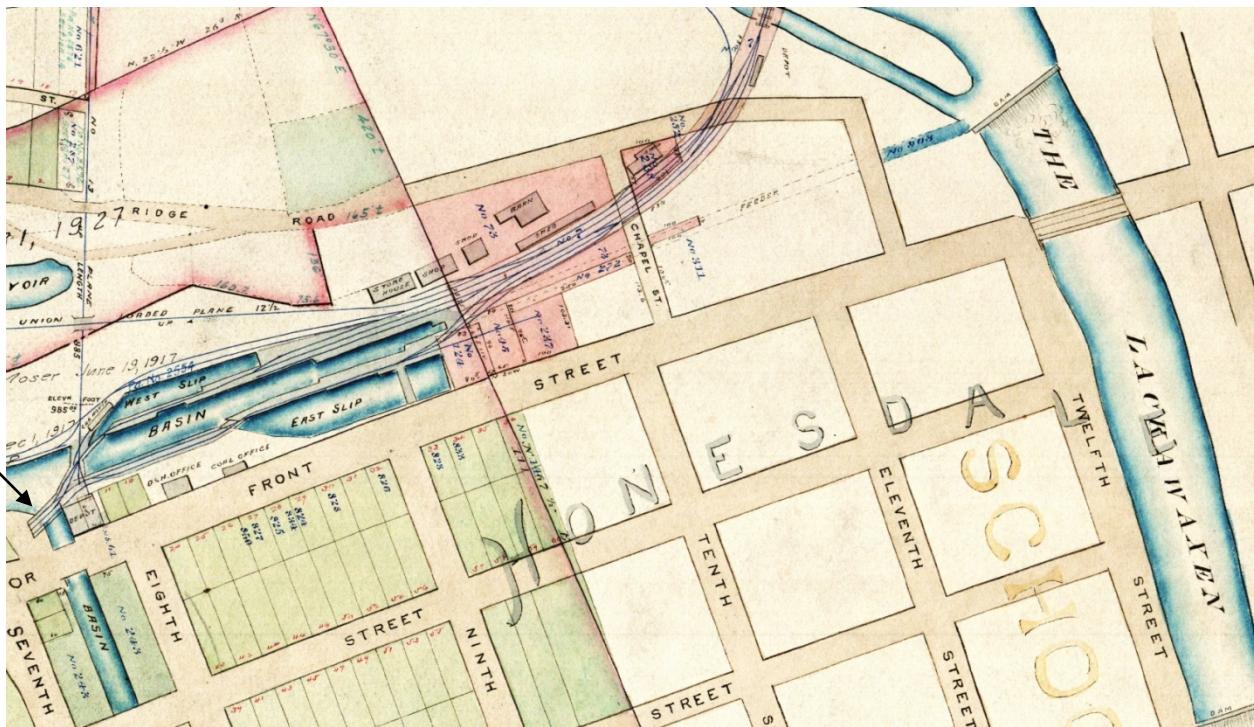
Six views of the D&H Canal in Honesdale in 1895 as shown in the 1895 D&H Gravity Railroad map volume:

View 1:

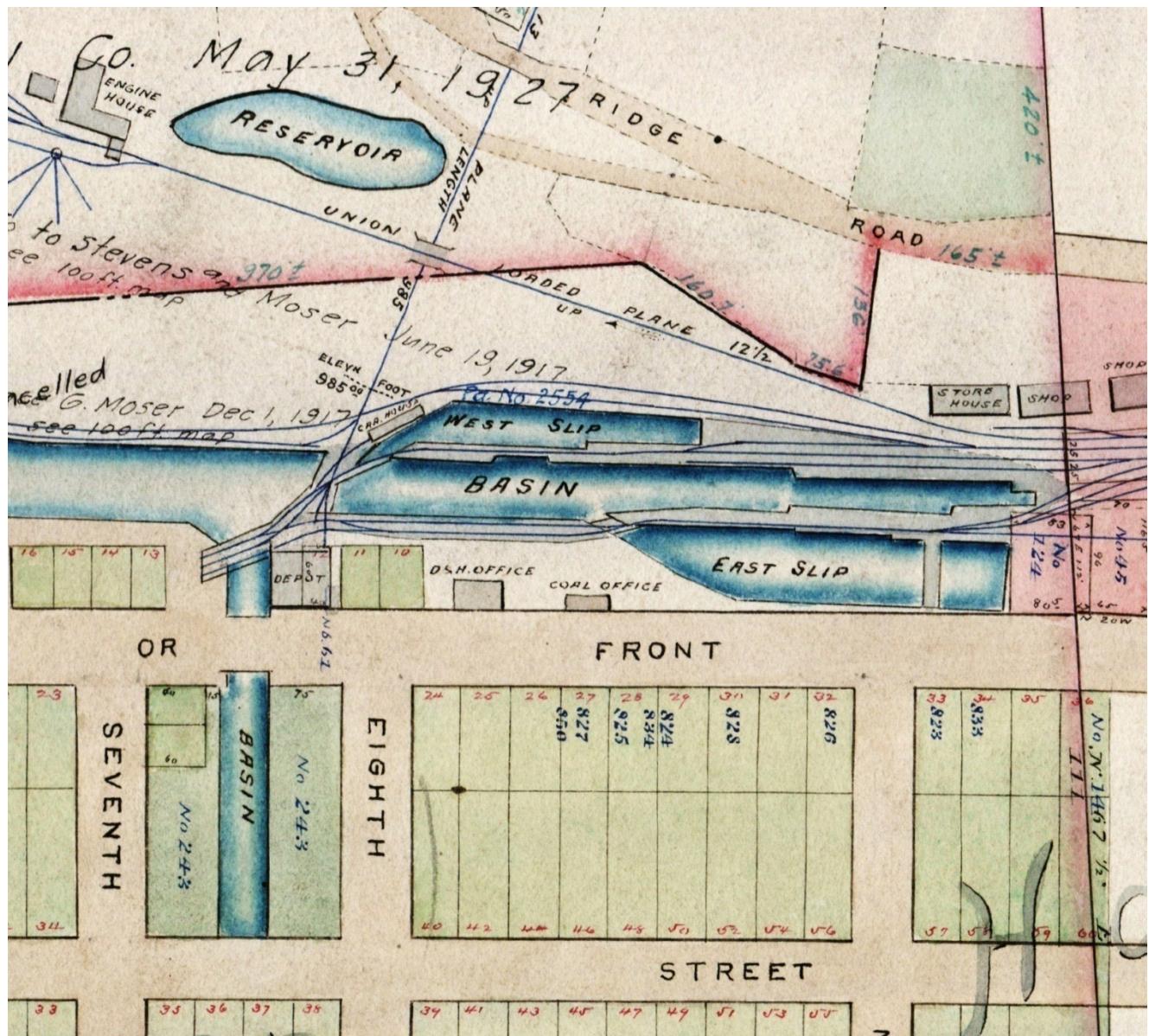


View 2

Bridge
over
Canal to
basin
between
7th and 8th
Streets

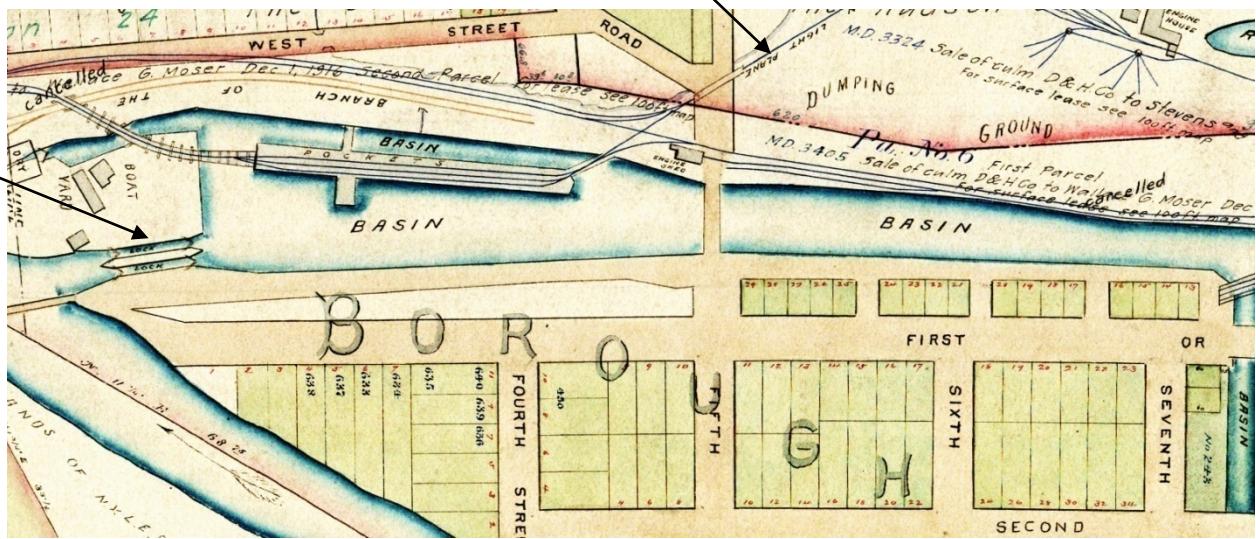


View 3

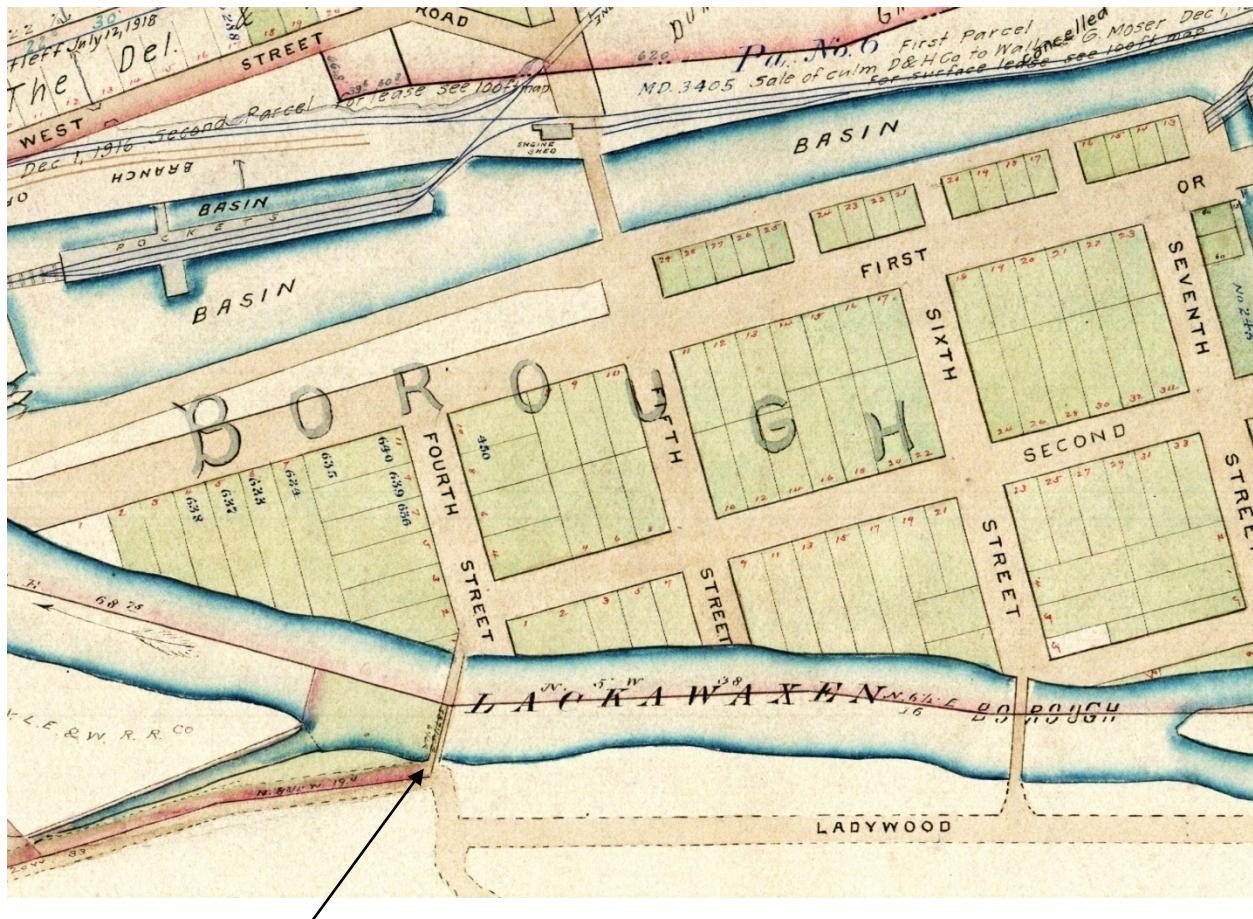


Double locks at lower end of Canal basin

View 4

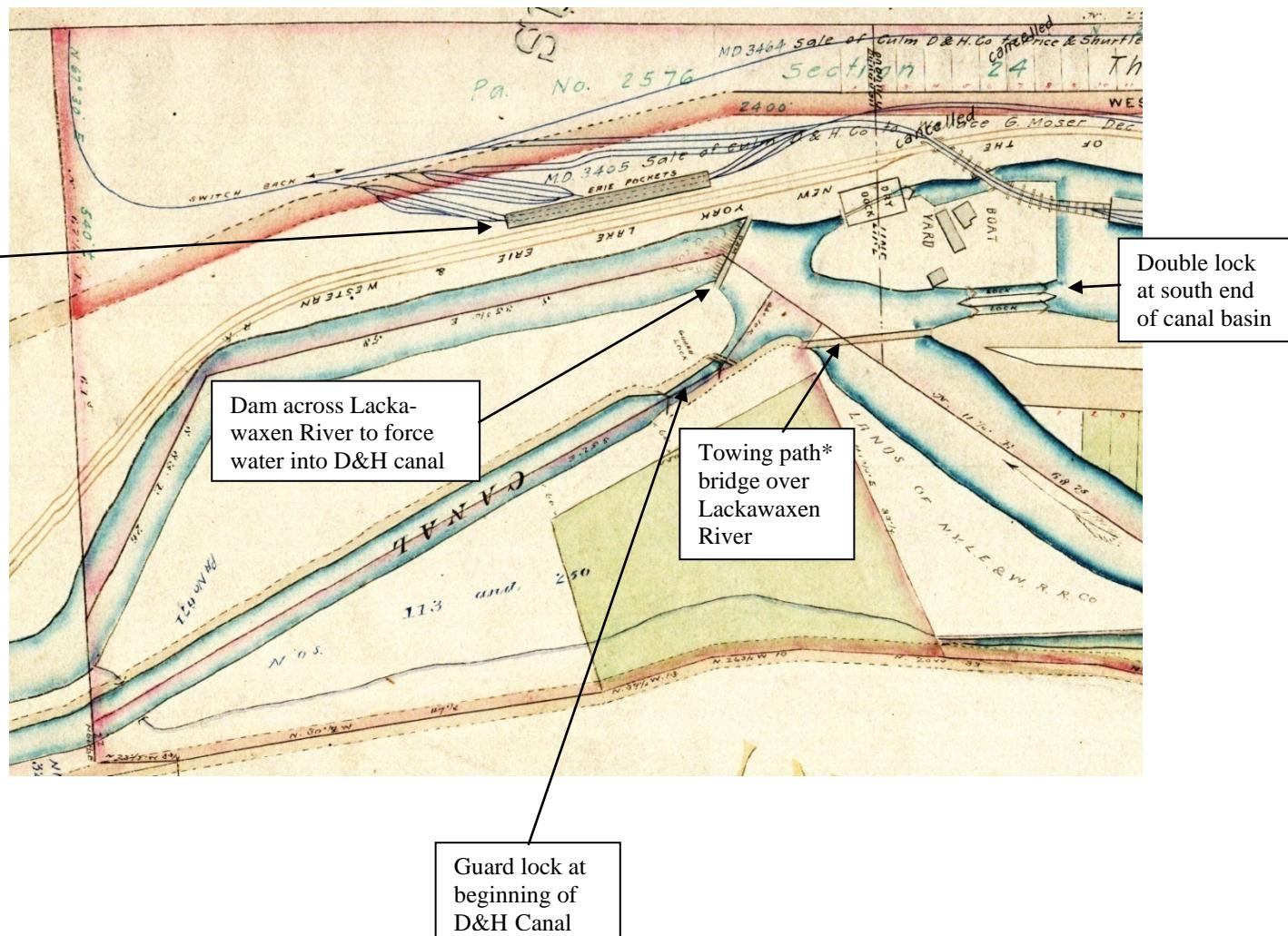


View 5



Fourth Street /
Covered Bridge across
Lackawaxen River

View 6



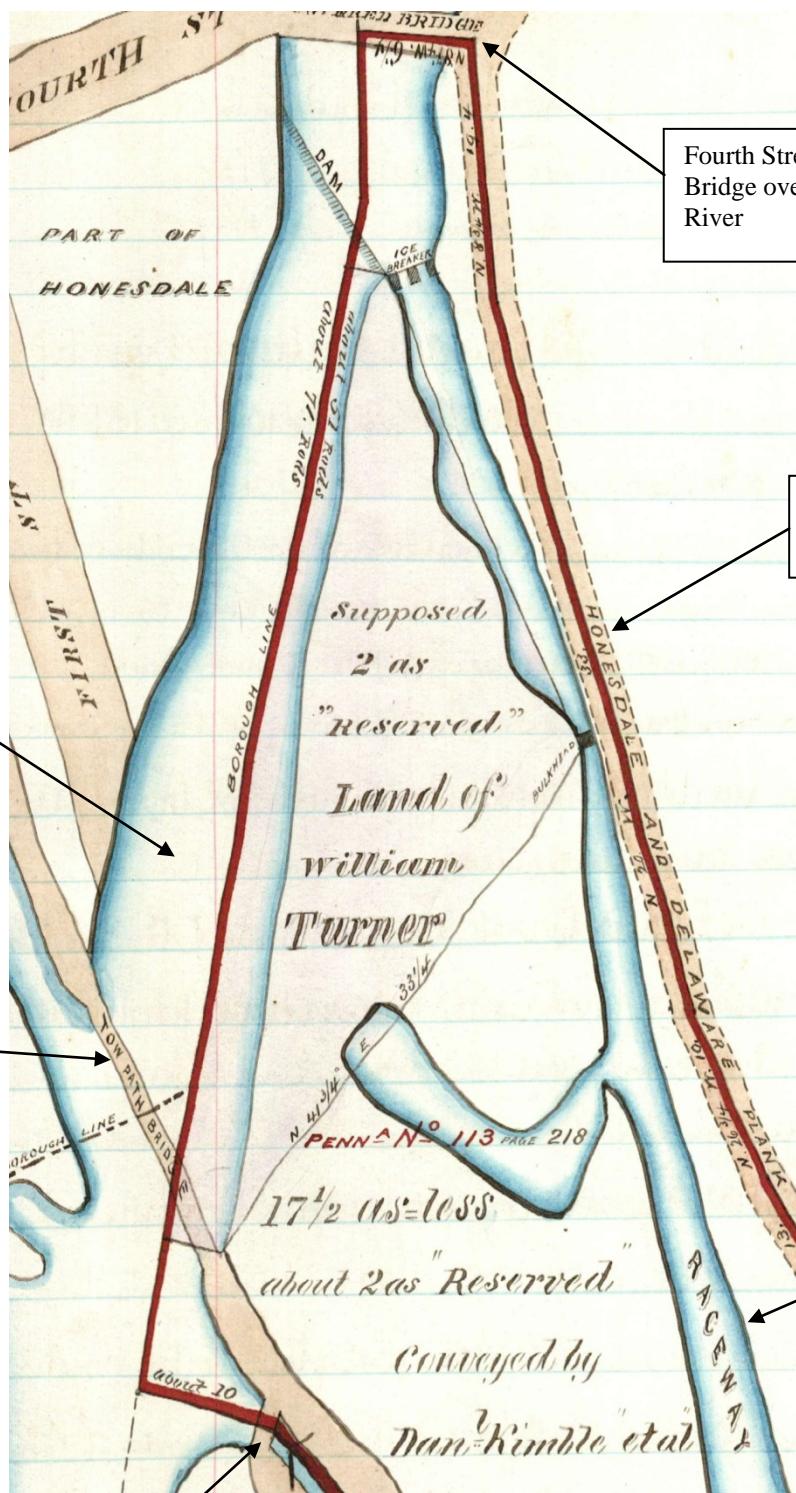
* In Section VIII of the April 23, 1823 "An Act to Incorporate the President, Managers and Company of the Delaware and Hudson Canal Company" we read: ". . . said corporation may form and construct a towing path, or paths, all necessary locks, aqueducts, culverts, dams, waste weirs, and toll houses. . ." Throughout these volumes on the D&H, we shall use the term "towing path," and not the later contraction, "tow path."

2954

The D&H Canal in Honesdale, as Seen in the Pennsylvania D&H Deed Book
(2 views)

View 1

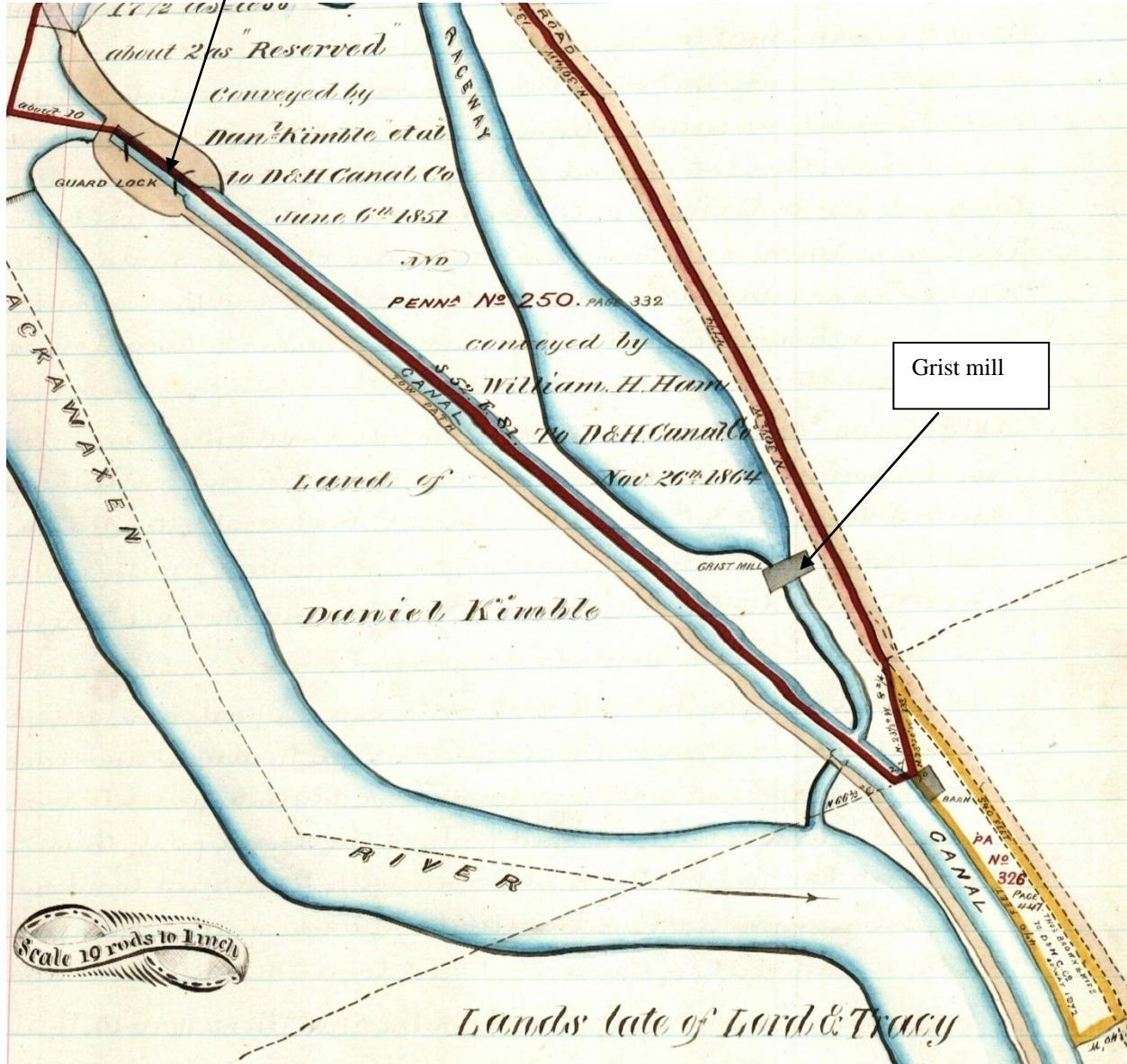
In the Pennsylvania *D & H Deed Book*, on page 221, there is a map, illustrating a deed, pp. 218-21, dated June 6, 1851, between Daniel Kimble / Benjamin F. Kimble and the Delaware & Hudson Canal Company. The downtown Honesdale operations of the Gravity Railroad and Canal are shown on that map. Here are two details from that map:



Guard lock at the beginning of the D&H Canal

View 2

Guard lock at the beginning of the
D&H Canal



2955

Four Stereo Photographers of the D&H Canal Company's Gravity Road and Canal, of Carbondale and Honesdale and Environs

Stereoscopic perception: when two pictures of the same object taken from slightly different angles (left-eye and right-eye views of the same object, each picture focused by a separate lens, with the two lenses inclined so as to shift the images toward each other), are simultaneously presented, one to each eye, each eye seeing only the image designed for it, the brain will fuse the two and accept them as a view of one solid three-dimensional object.

Ludolph Hensel

Hensel's historically important and technically brilliant "Stereoscopic Views of Carbondale and a Ride over the D&H Gravity Railroad into the Coal Region" was published in August 1879:

"Splendid Home Stereoscopic Views. / Mr. L. Hensel, a very skillful artist of Port Jervis, N. Y., has rendered our town, and our romantic coal region, a great service. For some months past he has been engaged in taking views upon the streets of our city, and of the whole town from surrounding elevations, and also along the line of our different railroads, including many wild, weird and romantic scenes. His subjects have been well chosen, and the work done with great judgment and skill. Together they make a collection of the finest stereoscopic views that have yet been published. No pictures can surpass them in romantic beauty, and we predict for them great popularity and a wide sale everywhere. Here, especially, they have an added and still greater value. They pertain to our own homes, and surroundings, and place in a most interesting form—so that they may be enjoyed at ease in our parlors—the picturesque beauty of scenes about us. They should be upon every centre table. / The names of the different views embraced in the list will be found in our advertising columns to-day, and a full supply can be found at the store of HENRY B. JADWIN, on the Public Square. Price 20 cts. each; \$2.00 per dozen." (*Carbondale Advance*, August 2, 1879, p. 3)

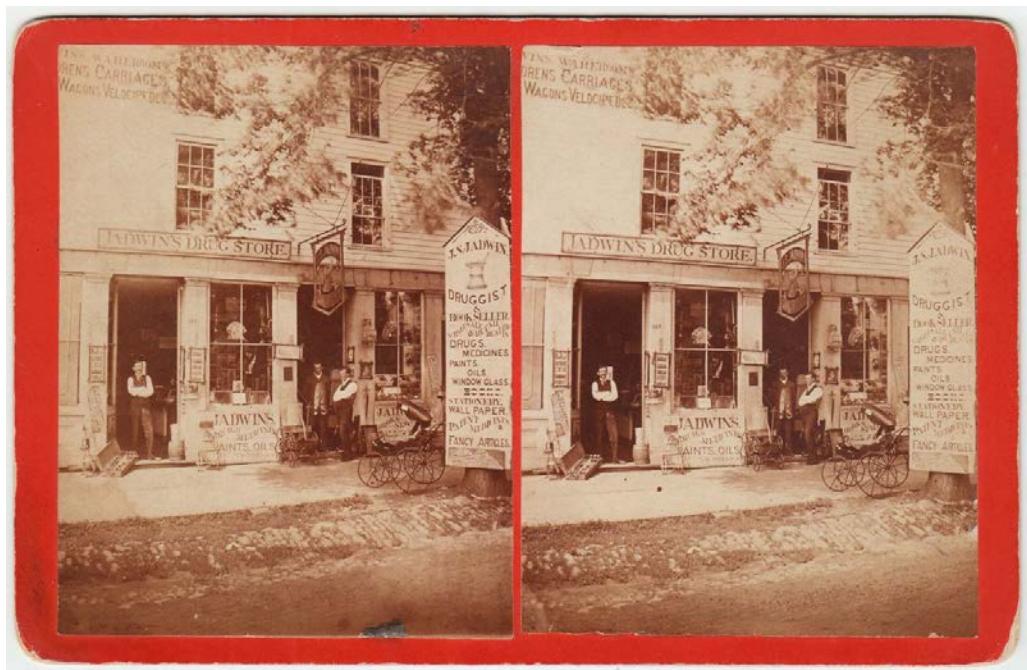
A copy of the ad placed in the *Carbondale Advance* (August 9, 1879, p. 2) for these Hensel stereoscopic views announced above ("Price 20 cts. each; \$2 per dozen. For sale by HENRY B. JADWIN") is reproduced below.

<p>Stereoscopic Views OF CARBONDALE, PA. AND A RIDE OVER THE DEL. & HUD. GRAVITY ROAD INTO THE COAL REGIONS.</p> <p>Photographed and Published by L. HENSEL, Port Jervis, N. Y.</p> <p>Th Marey House, near Del. & Hud. Depot. View down Main st. from the Marey House. View down Main st. from Wall street. Looking up Main st. from Wall street. View up Main st. from City Hall. East side of Main st. looking up from City Hall. West side of Main st. looking up from City Hall. East side of Main st. looking down from City Hall. West side of Main st. looking down from City Hall. Episcopal Church, seen from Main st. Episcopal Church, seen from the Bridge. The Roman Catholic Church, front view. View down Wall st. from Main street. Jermyn Block, Wall street. View down Church street. View of the Churches on Church street. Presbyterian Church, Church street. Carbondale, seen from above the Highworks. Head of No. 28, and Carbondale seen from above the Highworks. Van Bergen & Co.'s Iron Foundry, 3 views. Del. & Hud. Gravity Road Depot.</p>	<p>RAILROAD VIEWS: Honesdale seen from the Head of No. 13. The "Horse Shoe," seen from a ledge. Looking down from the Head of No. 14. Looking toward Depot, at Prompton, on Light Track. Looking toward Prompton, from Head of 15. Looking up No. 16 Plane, Passenger Train on Loaded Track. Looking down No. 16 Plane. Island on Keen's Lake, seen from Light Track. Keen's Lake, seen from Head of No. 17. The Angle at Head of No. 17 Plane. Depot and Tracks, seen from Foot-Bridge, at Waymart. Waymart, seen from Patterson's Hill. Waymart, seen from Old Dumping Ground. View down No. 18 Plane, with Passenger Train; Waymart in the distance. View down the Valley from Head of No. 11. Views of Shepherd's Crook. View of Passenger Train on Shepherd's Crook. View down Lackawanna Valley from Shepherd's Crook. Views in Rock Cut at Shepherd's Crook. Steep Grade at Shepherd's Crook. View down Lackawanna Valley from above Shepherd's Crook. View down Lackawanna Valley from Head of No. 23 Plane, at Olyphant. Olyphant, seen from near Head of No. 23. Grassy Island Breaker, near Peckville. View over the Gravity Road from Grassy Island Breaker. View of Inclined Bridges of the Del. & Hud., crossing the Lackawanna, at Peckville. View down the Lackawanna Valley from Plane No. 26. Views of Gravity Road from Head of No. 25. View of Archbald from Loaded Track. View of Archbald and Coal Breaker, seen from Railroad. View of Railroad Bridge at Foot of No. 26. View of Archbald and Coal Breaker, seen from Bridge at Foot of No. 26 Plane. View of Jermyn, seen from Head of No. 27. View of Carbondale, seen from Head of 28.</p>	<p>View of Van Bergen & Co.'s Foundry and Hendrick's Oil Works from Head of 28. View of Highworks and Shops from Head of No. 28 Plane. View of Carbondale, seen from No. 1 Plane. View of Racket Brook Gap, seen from Railroad. View of Racket Brook Breaker, looking up Plane No. 4. Views of Carbondale, seen from Plane No. 4. Views of Lackawanna Valley at Carbondale, at distance from No. 5 Plane. Bird's-eye View of Keen's Lake. Del. & Hud. Track crossing Keen's Lake. Views up the Gorge at Shepherd's Crook. Pleis Ground above Painter's Creek Falls, Shepherd's Crook. Manville Falls on Painter's Creek, seen from above. Manville Falls on Painter's Creek, seen from below. Van Bergen Falls on Painter's Creek. Devil's Slide on Painter's Creek. Wilbur Falls, seen from the Gravity Road. The Depot and Planes at Waymart, seen from the Highworks. The Highworks at Waymart. McGarry Avenue on the Gravity Road.</p>	<p>Price 20 cts. each; \$2 per dozen. For sale by HENRY B. JADWIN.</p>
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The stereocards listed in the above ad include are all of those listed on the first Hensel series in our list of four series given below, as well as cards Nos. 1167-1190 in the second Hensel series in our list. The Jadwin's ad, see below, speaks of stereoscopic views of Crystal Lake as well—which tells us that the third Hensel series in our list was in existence in 1879, as well. We can legitimately deduce, then, that the first three Hensel series in our list were all in existence in August 1879. Given the text in the article in the *Carbondale Advance* of August 2, 1879 (given above), it seems highly probable that all of the cards in the first three Hensel series in our list were created in 1879.

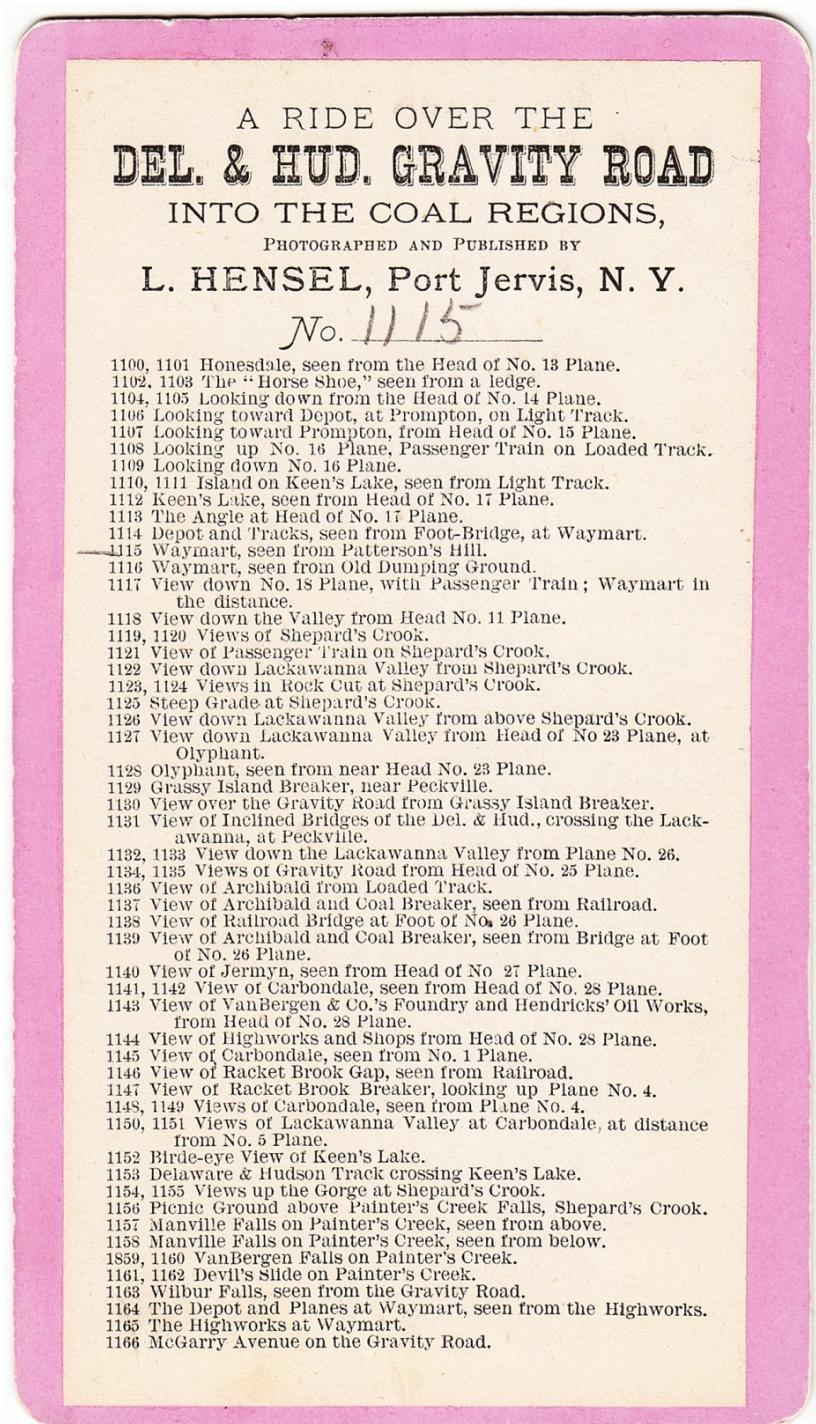
Stereo views for sale at Jadwin's: "Call and see the stereoscopic views of the Gravity R. Road, Crystal Lake, and Carbondale, at J. S. Jadwin's." (*Carbondale Advance*, August 30, 1879, p. 3)

Given below is a stereo-view of Jadwin's by an unidentified photographer. The format of the card is larger than most Hensel stereo cards, although it is identical in size to the Hensel series titled *THE BEAUTIFUL SCENERY OF PIKE CO., PA., Photographed and Published by L. HENSEL, Port Jervis, N. Y.* So it may be a Hensel. The only known copy of this card is the one that was donated to the Carbondale Historical Society by Janice Carlson, Carbondale. On the back of this card, the following is written in pencil: "Jadwin's Drug Store / Salem Avenue / Carbondale, Pa / W. J. Male / worked in this store as a clerk"



Stereocards by L. Hensel in five separate series are in the collection of the Carbondale Historical Society. The sequence in which we have numbered them here is arbitrary. At present we do not know the specific years in which Series Four and Series Five produced. Series 1-3, we believe, date from 1879. The back of a representative card from each series is given below:

1. A RIDE OVER THE DEL. & HUD. GRAVITY ROAD INTO THE COAL REGIONS,
Photographed and Published by L. HENSEL, Port Jervis, N. Y. (Referenced in the above ad from
the August 2, 1879 issue of the *Carbondale Advance*). 1879. All of the images in this series, Nos.
1100-1166 are of the D&H Gravity Railroad. Note that there are also D&H images in the second
and third series shown below.



2. *STEREOSCOPIC VIEWS of CARBONDALE, PA. Photographed and Published by L. HENSEL, Port Jervis, N. Y. 1879.* (Referenced in the above ad from the August 2, 1879 issue of the *Carbondale Advance*). 1879. Views Nos. 1167-1190 in this series are of Carbondale. Also in this series are views of Pike County, PA: Views Nos. 209-238. Additional views of Pike County are given in the fourth series listed here.

STEREOSCOPIC VIEWS
OF
CARBONDALE, PA.
Photographed and Published by
L. HENSEL, Port Jervis, N. Y.
No. 1188

No.

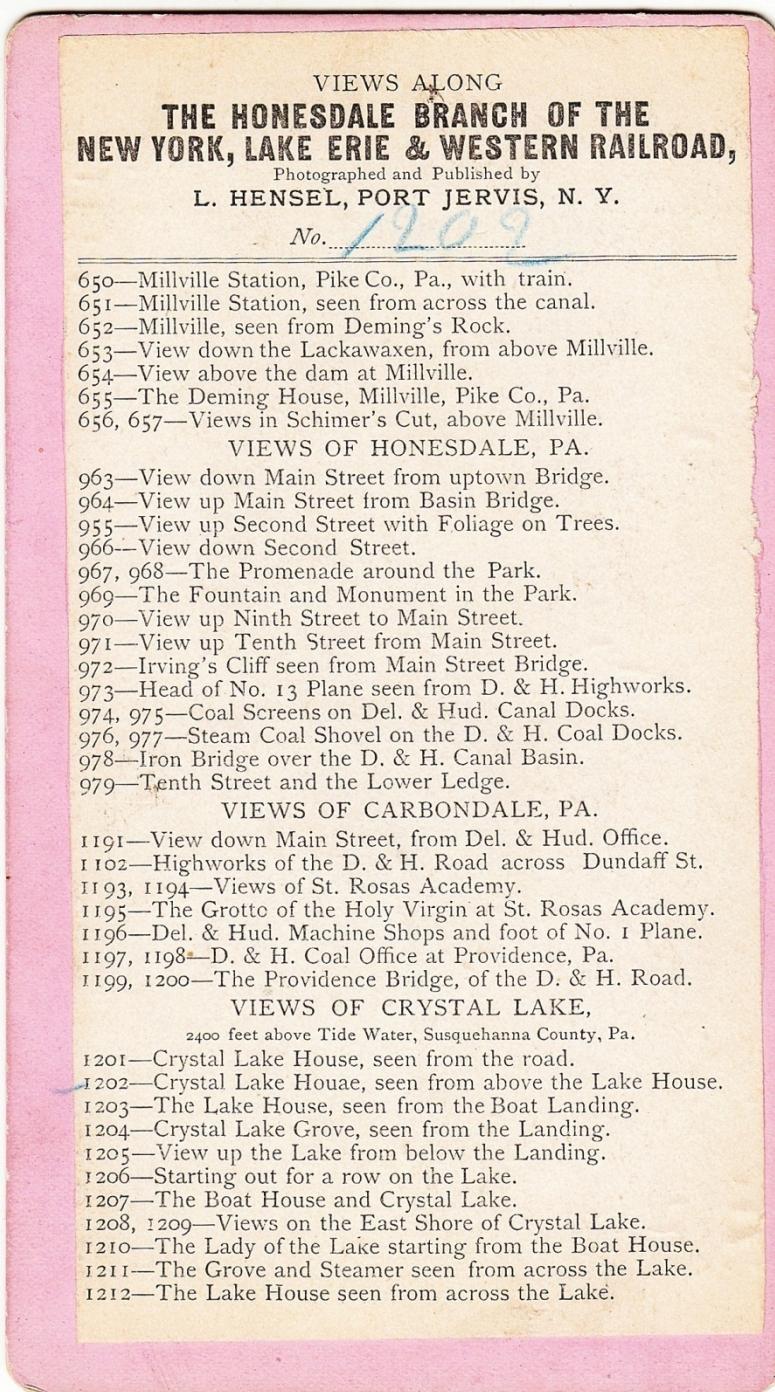
1167-1168—THE MARCY HOUSE, near Del. & Hud. depot.
1169—View down Main street from the Marcy House.
1170—View down Main street from Wall street.
1171—Looking up Main street from Wall street.
1172—View up Main street from City Hall.
1173—East side of Main street, looking up from City Hall.
1174—West side of Main street, looking up from City Hall.
1175—East side of Main street, looking down from City Hall.
1176—West side of Main street, looking down from City Hall.
1177—Episcopal Church, seen from Main street.
1178—Episcopal Church, seen from the Bridge.
1179—The Roman Catholic Church, front view.
1180—View down Wall street, from Main street.
1181—Jermyn Block, Wall street.
1182—View down Church street.
1183—View of the Churches on Church street.
1184—Presbyterian Church, Church street.
1185—Carbondale, seen from above the Highworks.
1186—Head of No. 28 Plane, and Carbondale seen from above the Highworks.
1187-1188-1189—Van Bergen & Co's Iron Foundry.
1190—Del. & Hud. Gravity Road Depot.

VIEWS OF PIKE COUNTY, PA.

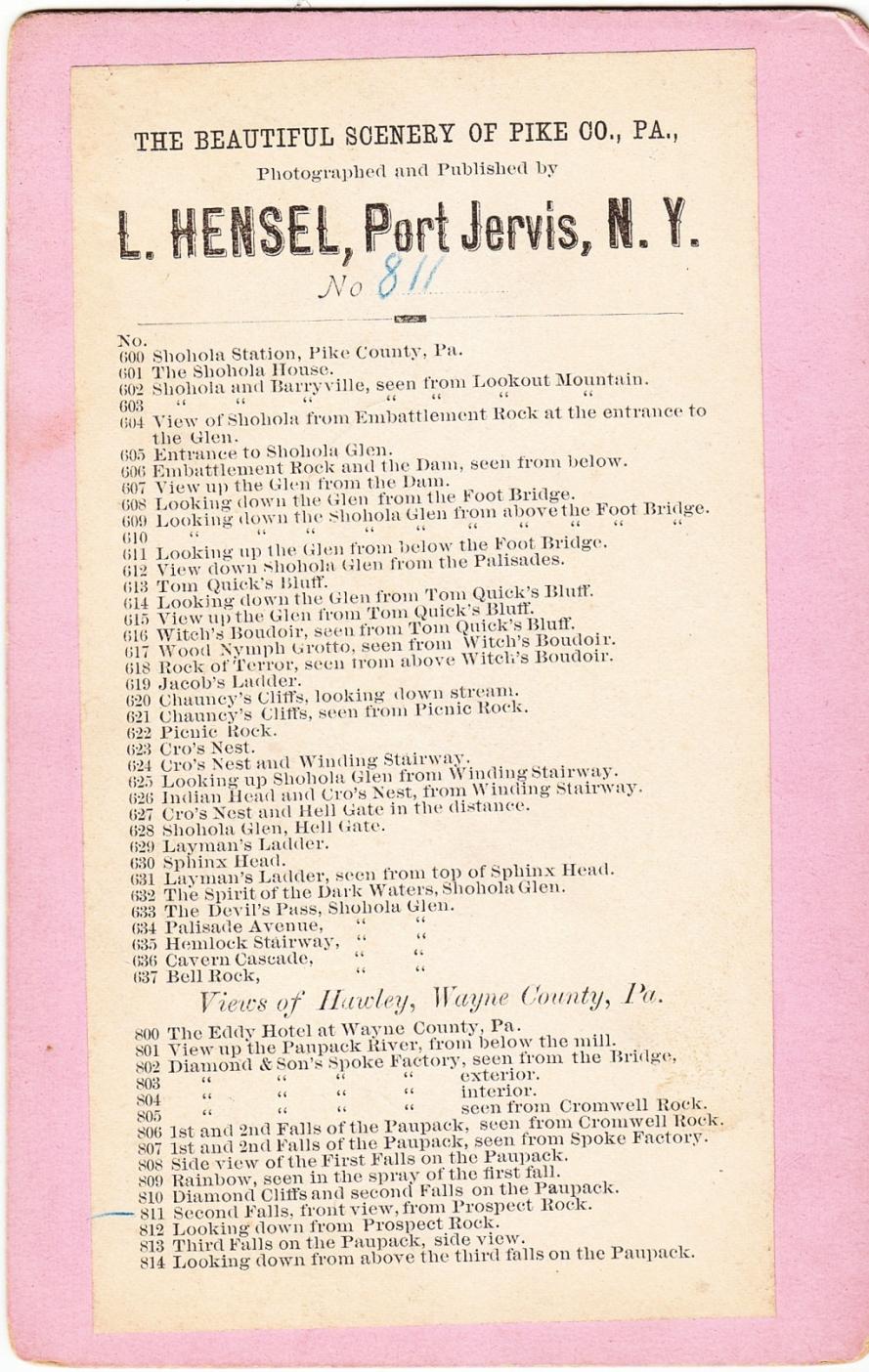
209—The Bluff House, Milford, Pike County, Pa.
210—View down the Delaware Valley, from the Bluff House.
211—Episcopal Church, Milford, Pa.
212—213-214—The new Foot Bridge in the Glen, Milford, Pa.
215—The Drive in the Glen, Milford, Pa.
216—Reflection in the Sawkill in the Glen, Milford, Pa.
217—The Sawkill House, Milford, Pike County, Pa.
218—Conashauh Spring House, Pike County, Pa.
219—High Falls Hotel, Dingman's, Pike County, Pa.
220—Bellevue Hotel, Dingman's Ferry, Pike County, Pa.
221—Upper Cascade of the Indian Ladder.
222—Indian Ladder, first run.
223—Lower run of the Indian Ladder, seen from above.
224—Lower run of the Indian Ladder, seen from below.
225—Indian Ladder High Falls, close view.
226—Indian Ladder High Falls, distant view.
227—Factory Falls and Table Rock.
228—229—Factory Falls on Dingman's Creek.
230—Fulmer Falls, front view.
231—Fulmer Falls, side view.
232—The Gorge, seen from above Fulmer Falls.
233—Fulmer Falls, front view from below.
234—Fulmer Falls, seen through the rocks.
235—Distant view of the Fulmer Falls.
236—Deerleap Falls, front view.
237—238—Deerleap Falls, side view.

27085

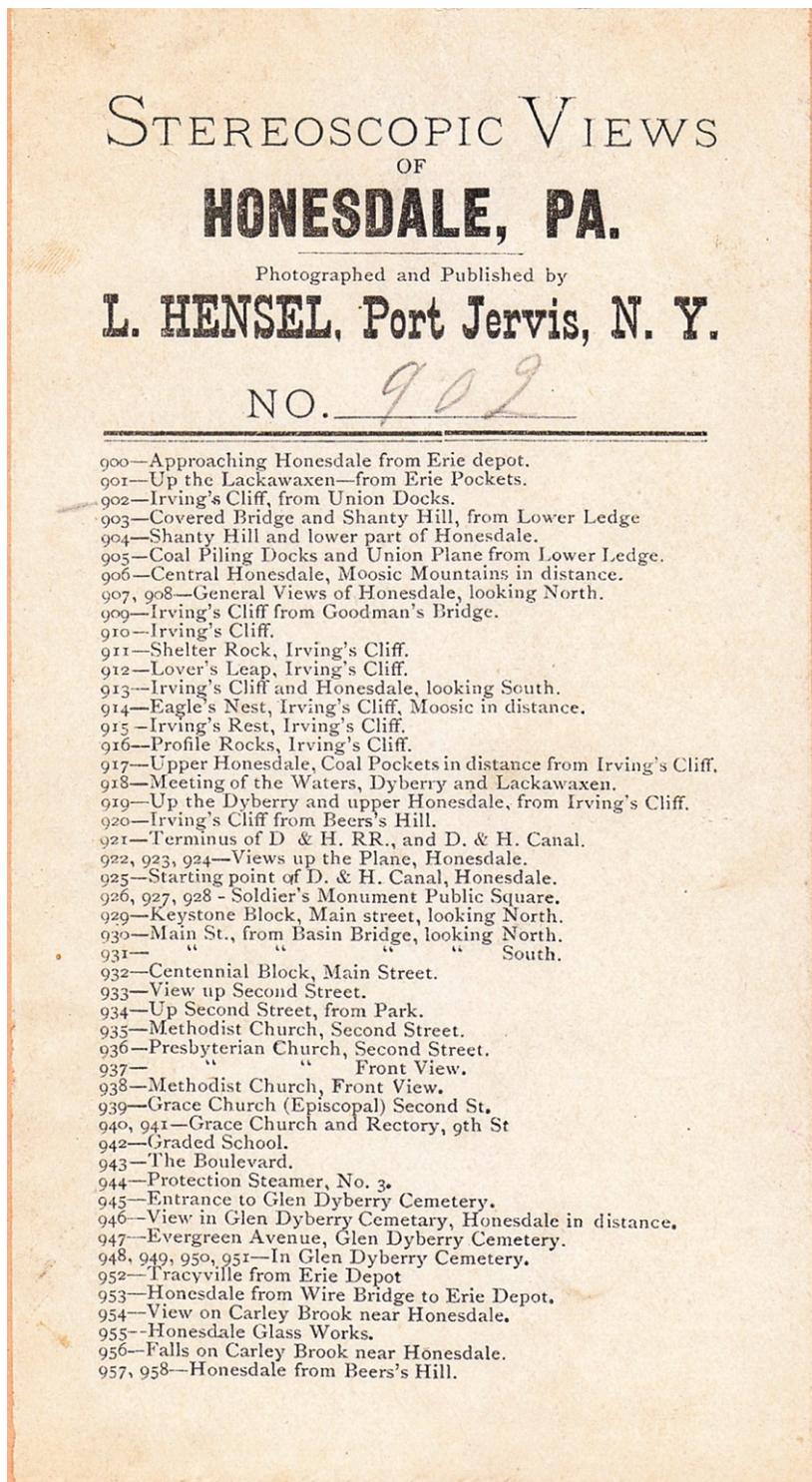
3. Views along THE HONESDALE BRANCH OF THE NEW YORK, LAKE ERIE & WESTERN RAILROAD, Photographed and Published by L. HENSEL, PORT JERVIS, N. Y. 1879. (Referenced in the above ad from the August 2, 1879 issue of the *Carbondale Advance*). Views No. 650-657 in this series are of the Honesdale Branch of the New York, Lake Erie & Western Railroad. Also in this series are views of Honesdale (Nos. 963-979; views of Carbondale (Nos. 1191-1200); and views of Crystal Lake (No. 1201-1212).



4. *THE BEAUTIFUL SCENERY OF PIKE CO., PA., Photographed and Published by L. HENSEL, Port Jervis, N. Y.* The date on this series is not yet known. The cards in this series are larger than those in the first three series listed above. Views Nos. 600-637 in this series are of Pike County; views Nos. 800-814 in this series are of Hawley, Wayne County.



5. *Stereoscopic Views of HONESDALE, PA. Photographed and Published by L. HENSEL, Port Jervis, N. Y.* The views in this series are numbered 900-958. The date on this series is not yet known.



A. M. Slocum

Slocum was an agent of the Union Photographic Company of 110 State Street, Rochester, NY and his assistants photographed "one hundred and twenty-one of our [Carbondale] best residences" in 1880. In the newspaper notice given immediately below, the author of this text noted, correctly and prophetically, that "They [these Slocum views of Carbondale] are not only pleasing and valuable to friends now, but will be still more so in the future."

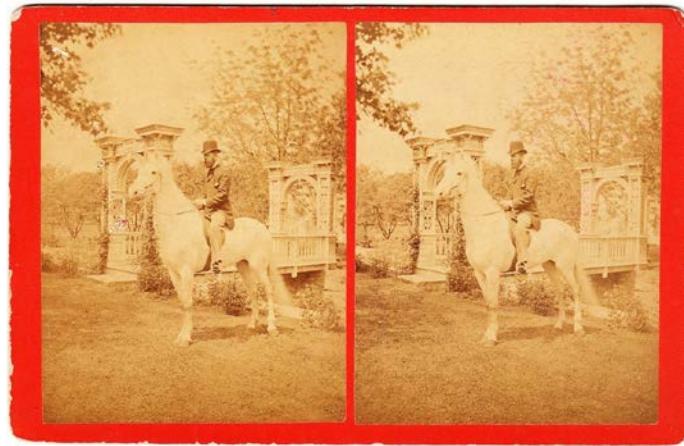
“Photographic Views. / Our town was never before so fully and so well photographed, as it has been during the past month by A. M. Slocum, Esq., and his assistants. Mr. Slocum is agent of the Union Photographic Co. of 110 State street, Rochester, N. Y., and travels with a horse and carriage, and all necessary apparatus and appliances for doing his work. And the work done is of the highest and best character. In our town he selected one hundred and twenty-one of our best residences, and took impressions of them, giving the proprietors to understand that it would be entirely at their option, whether they purchased them or not. No one was to be regarded as under any obligations to purchase, unless they chose to do so. The negatives were sent to Rochester and in a few days the pictures returned. In every case they gave great satisfaction. People were agreeably surprised, and with a very few exceptions purchases were made. Mr. Slocum goes from our city to Wayne Co., to 'do' the villages there, including Waymart, Prompton, Honesdale, &c. We can cheerfully recommend him, as an artist of real merit and we have no doubt that he will render there the full satisfaction in his work, that he has done here. The idea of having photographic views of residences is a good one, and is rapidly gaining ground. They are not only pleasing and valuable to friends now, but will be still more so in the future. They will increase in interest with each succeeding year. Our friends in Wayne will do well to patronize Mr. Slocum, and secure correct and artistic views of their residences." (*Carbondale Advance*, March 29, 1880, p. 3)

There most surely are in private and public collections in Waymart, Prompton, and Honesdale stereo views by A. M. Slocum.

The stereocard shown above of the Jadwin Drug Store might well be one of the photos that A. M. Slocum and his assistants took of "one hundred and twenty-one of our best residences."

Also in the collection of the Carbondale Historical Society are three stereo card views taken on the grounds of the Hendrick residence on Lincoln Avenue. These three Hendrick photos might well be three of the photographs taken by A. M. Slocum and his assistants.

Given below is a photo of a man on horseback on the grounds at Hendrick Park. The rider is very probably E. E. Hendrick himself. Side Note: There was a Hendrick stop on the Gravity Railroad.



Crocker, George H.

In 1881, Crocker began producing stereoscopic views in, and most probably of, Carbondale. This we know from the notice that was published in the *Carbondale Advance* of May 28, 1881.

“Stereoscopic Views. / Geo. H. Crocker has commenced producing very fine Stereoscopic Views; to which he wishes to call the attention of his friends and the public. All persons wishing anything in that line are requested to call on him.” (*Carbondale Advance*, May 28, 1881, p.3)

We have not seen a stereo card that was produced by George H. Crocker.

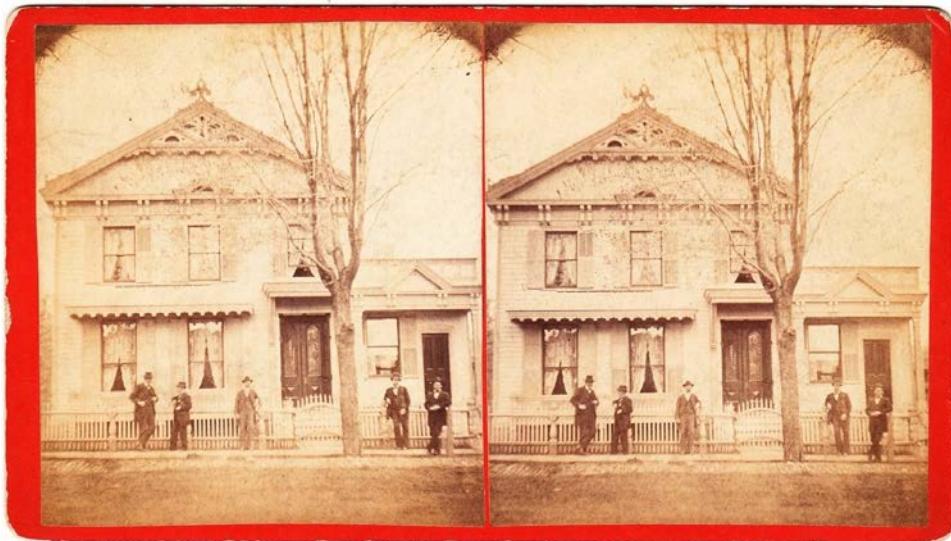
Yarrington, H. C.

Yarrington took a bird's-eye-view of Carbondale in 1876:

“Mr. H. C. Yarrington, the photographer, has recently taken a bird's-eye view of Carbondale, taken from the knoll just north of the Graded School building back of Davis's engine. The business portion of the town, and all the most prominent buildings are plainly shown. A wood-cut of the view is to be made for a history of the State, a work which is being written by a gentleman of Harrisburg.” (*Carbondale Leader*, May 13, 1876, p. 3)

A. B. Durfee provided livery service in Carbondale for passengers arriving and departing on D&H passenger trains in the nineteenth century. A stereo card, identified on the back as "Residence of A. B. DURFEE, Carbondale, PA. Photographed by H. C. Yarrington," is in the collection of the Carbondale Historical Society.

Shown below is the residence of A. B. Durfee, as photographed by H. C. Yarrington.



"Residence of A. B. DURFEE, Carbondale, PA. Photographed by H. C. Yarrington"

The leading authority on studio photography in Carbondale and in northeastern Pennsylvania in the nineteenth and twentieth centuries is the author's twin brother, Donald W. Powell. In his photographic collection and archives, one can surely find additional information on the four stereoview photographers that we have, for the record, presented here.

2956

The Delaware & Hudson Canal Company's Gravity Railroad: An Engineering Achievement of National Importance

The Delaware & Hudson Canal Company's Gravity Railroad from Carbondale to Honesdale, in each of its five configurations (1829, 1845, 1859, 1868, and 1899) in the course of the nineteenth century, was an engineering achievement of the first magnitude. In the present volume, we have focused only on the 1829 configuration, which was designed by one of the most noted American civil engineers, John Jervis. Following his work for the D&H, it is interesting to note, Jervis went on to do work for the New York Central and several other railroads and also served as the chief engineer on the Croton aqueduct.

John Jervis died on January 12, 1885. Here is his obituary as published in a Rome, NY newspaper on the following day:

"A VETERAN ENGINEER'S DEATH. / JOHN B. JERVIS, WHO HELPED TO CONSTRUCT THE ERIE CANAL. / ROME. N. Y., Jan. 13.—John B. Jervis, the well-known American civil engineer, in whose honor the town of Port Jervis, Orange County, was named, died at his residence here last night. He was in his ninetieth year, having been born at

Huntington, Long Island, Dec. 14, 1795. His first important engineering service was rendered in the construction of the Erie Canal, and when that great work was completed he conducted the survey and construction of the Delaware and Hudson Canal. He was afterward chief engineer in charge of the construction of the Albany and Schenectady and the Schenectady and Saratoga Railroads, and for the latter road he invented the locomotive truck [emphasis added], the principle of which is now applied to all railroad locomotives. This invention was made in 1832, and the first locomotive with this improvement was constructed to order in England at the works of R. Stephenson. / Mr. Jervis's greatest work was the construction of the Croton Aqueduct which supplied New-York City with water, and of which he was the engineer in charge in 1836. The completion of this great work gave him a world-wide reputation, and he was engaged as consulting engineer on the Boston water works from 1846 to 1848. The following year he was made chief engineer of the Hudson River Railroad, a position which he held for two years. After this the Michigan Southern, Northern Indiana, and Chicago and Rock Island Railroads were constructed under his direction, and he was President of the Chicago and Rock Island in 1854. His next work was the building of the Pittsburg, Fort Wayne and Chicago Railroad. Since 1868 he had lived in this city, acting as the Secretary and practical head of the Rome Merchant's Iron Mill. He published a work on "Railway Property," one on "Labor and Capital," and wrote lectures on "Industrial Economy" at the age of 83. He was an earnest Christian and noted for his benevolence and his upright life." Special thanks to our colleague Bill Merchant at the D&H Canal Historical Society and Museum at High Falls, NY for making a copy of this Jervis obituary available to us.

For his work for the New York Central railroad, Jervis was presented by the New York Central with a solid silver life pass. For his work on the Croton aqueduct, he was presented with a gold medal. Regarding those two awards, pasted into one of the Gritman scrapbooks, immediately following the 1902 article by P. S. Joslin titled "Concerning the Gravity Road" that we spoke of earlier in this volume, is an article, dated Saturday, May 3, 1902, probably from the *Carbondale Leader*, about John Jervis. Here is that article:

"In a Reminiscent Vein. / A dispatch from Rome, N. Y., says a solid silver life pass, only two of which were ever issued, presented to the late John B. Jervis by the directors of the New York Central railroad, April 1, 1856, and a gold medal presented to Mr. Jervis in 1844 as chief engineer of the Croton aqueduct that supplies water to New York city, have been stolen from the Jervis public library in that city, founded by Mr. Jervis. / It is disheartening to even the average reader to hear of such dastardly acts. The articles can be of no possible value to the sneaking thief that took them and the deed is one born in the mind of a degenerate. The loss is, however, a considerable one to Rome, N. Y., and to all who cherish historical relics. Carbondalians take a peculiar interest in the news telegraphed from Rome by the fact that Mr. Jervis was one of the first residents of our town and to his engineering skill and ability we owe the early prominence that the place took in the history of northeastern Pennsylvania. / Mr. Jervis was probably the most noted civil engineer of his time. He planned and surveyed, the works of the Delaware & Hudson company in their inception." (clipping, dated Saturday, May 3, 1902, pasted into a Gritman scrapbook)

John Jervis was the most noted civil engineer of his time, a period that has been identified, by Peter Brown, among others, as "the heroic age of American invention, the three decades from 1830 until the Civil War.".

The opening of the D&H Gravity Railroad on October 9, 1829 took place at the dawn of what Peter Brown identifies as "the heroic age of American invention, the three decades from 1830 until the Civil War." ("Men of Progress," *American History*, August 2010, pp. 34-41).

In that article Brown identifies twenty masters of that heroic age, scientists and inventors who "produced a host of labor-saving mechanical devices and practical scientific advances that forever changed the American way of life [and] altered the course of contemporary civilization."

Those twenty masters all appear in a painting that Jordan Nott, the inventor of the coal-burning cookstove, commissioned Christian Schussele (1824–1879) to paint in 1857. The painting, titled *Men of Progress*, now hangs in the National Portrait Gallery, Smithsonian Institution, in Washington, DC (transfer from the National Gallery of Art; gift of Andrew W. Mellon, 1942).



Christian Schussele's *Men of Progress* (National Portrait Gallery, Washington, DC, oil on canvas, 1862) was described in 1862 as a painting of "the most distinguished inventors of this country, whose improvements . . . have changed the aspect of modern society, and caused the present age to be designated as an age of progress." John Jervis, although not pictured with these men, was every bit their equal.

The nineteen men in the painting were brought together only in the artist's imagination. They never actually met together in one room. Each posed separately for the artist, who assembled them for the first time on the canvas.

These "men of progress" (left to right in the painting) and their inventions are:

Dr. William Thomas Green Morton: surgical anesthesia
James Bogardus: cast-iron construction
Samuel Colt: revolving pistol
Cyrus Hall McCormick: mechanical reaper
Joseph Saxton: coal-burning stove, hydrometer, ever-pointed pencil
Charles Goodyear: vulcanization of rubber
Peter Cooper: railway locomotive
Jordan Lawrence Mott: coal-burning cooking stove
Joseph Henry: electromagnet design
Eliphalet Nott: efficient heat conduction for stoves and steam engines
John Ericsson: armored turret warship
Frederick Sickels: steam-engine gear and steering device for ships
Samuel F. B. Morse: electric telegraph
Henry Burden: horseshoe manufacturing machine
Richard March: rotary press
Erastus Bigelow: power loom for carpets
Isaiah Jennings: threshing machine, repeating gun, friction match
Thomas Blanchard: irregular turning lathe
Elias Howe: sewing machine

In the background appears a portrait of Benjamin Franklin, the patron saint of American science and invention.

One of those twenty masters, most interestingly from our present perspective, was Peter Cooper, who created Tom Thumb (a four-wheel locomotive with a vertical boiler and vertically mounted cylinders that drove the wheels on one of the axles), the first American-built steam locomotive used by a common-carrier railroad, the Baltimore & Ohio.

In a celebrated race, on August 28, 1830, on parallel B&O tracks between Baltimore and Ellicott Mills, between Tom Thumb and a horse-drawn car, the race was won by the horse, primarily because a belt slipped off the blower pulley on Tom Thumb, which caused the engine to lose power. Even though the steam engine lost on that fateful day (because of a technical/mechanical problem), its performance capability was immediately realized—and capitalized on—by the B&O and scores of other American railroads.

It is important to recall that the D&H Gravity Railroad from Carbondale to Honesdale became operational on October 9, 1829, one year before the Tom Thumb was built.

The point here is this: the D&H were pioneers. The railroad they created was an engineering achievement of national importance. The D&H Gravity Railroad, as well as the achievements of the 20 masters identified by Peter Brown, made possible the industrial revolution in America, which altered the course of American civilization.

The Delaware & Hudson Canal Company's Gravity Railroad was an engineering achievement of national importance, and it would not have had the success that it was without the men women who worked for "the company" from the outset and throughout the nineteenth century.

Who were those tens of thousands of folks who worked for the D&H? Where did they come from?

Mining and Railroad Workers

In the 1820s and 1830s, many Welsh, Scottish, English, and German immigrants came to the village of Carbondale, the population of which, in 1833, was 600. In 1833, in the village of Carbondale, there were six general stores, two hotels, one drug store, one clothing store, several small groceries, two hotels, two doctors, one lawyer, four churches, and mechanics of all kinds. In 1850, the population of the village was 4,954.

On the question of emigration to America from the end of the eighteenth century to the middle of the nineteenth century, Nye reports the following:

"From 1775 to about 1815 both America and Europe were so entangled in wars that it was difficult for immigrants to leave Europe and equally difficult for them to enter the United States. A few came (about a quarter million during these years) but postwar inflation and depression discouraged others for several years after the peace of 1814. The prosperity of the twenties and thirties, however, and the swift growth of the American economy, turned the stream of arrivals from abroad into a torrent. / The United States offered dazzling prospects to the immigrant. Europe's increased population—which doubled between 1790 and 1830—had nowhere to go; depression, unemployment, epidemic, and famine plagued every country. . . On the other hand, in the United States labor was scarce and wages were double or more the European rate; good land cost about one-fourth of what poor land in Europe. Fare to the United States was not expensive (4 to 6 pounds Sterling from England) and there was plenty of work and plenty to eat. . . Europeans knew little about America, but what they did know was romantic and attractive, compounded out of Cooper's wilderness, Jefferson's agrarian empire, Jackson's kingdom of the common man, and tall tales of miles of virgin trees and acres of fertile soil. Travelers reported the beauties of the new land, newly arrived settlers wrote home about it, and land companies advertised it tirelessly. States passed legislation favorable to immigrants. . . During the 1830s immigrants arrived at the rate of 60,000 a year, then 80,000, then 100,000, and by the late forties 150,000 a year. In 1851, 400,000 arrived, and in 1854, the peak year, 427,833, a number gradually reduced to 144,000 in 1858 (after the panic of 1857) and 141,000 in 1860." (Nye, pp. 202-203)

Who were they and where did these many thousands of immigrants come from? We learn from Nye the following about these new Americans:

"Although the majority were workers and farmers, the flood swept up people from all classes. . . Of course, when they could scrape together the fare, the poor came in droves, and with them the

landless, the displaced, the victims of war, depression, and famine. But most were laborers, who for the first time formed a distinctive and different American working class, with its own special needs and its own class and cultural outlooks—not a 'working class' in the European sense, for it had too many rights and too much mobility for that, but a working class nonetheless. . . The largest immigrant groups were Irish and German. During the thirties, arrivals from Ireland made up 44 percent of the total and those from the German states about 30 percent; in the forties the Irish rate reached 49 percent, with the German rate about the same. . . Ireland, in a chronic state of depression after 1790, offered nothing to keep Irishmen at home. They began to stream out of Ireland toward Australia, Canada, and the United States after 1830, and after the potato rot epidemics of 1845 and 1846 destroyed nearly one-half the crop, the Irish economy collapsed, bringing poverty, starvation, and suffering. One hundred and five thousand Irish entered the United States in 1847, 221,000 in 1851, and the rate continued to rise for another five years. / . . . Not easily assimilated into a Protestant, industrialized, urban culture, the Irish usually worked as servants and laborers. . . Yet they were ambitious, hardworking, energetic people . . / There were fewer Germans who came before 1860, but they had equal influence on American life. Though the rate increased after the revolution of 1848, Germans were already arriving in sizable numbers during the thirties. . . During the fifties, German immigration slightly exceeded Irish. The peak year for German immigration was 1854, when 101,000 Irish and 215,000 Germans came. From that point German immigration exceeded Irish." (Nye, pp. 204-05)

One of the primary national groups that came to the Lackawanna Valley in great numbers following the War of 1812 were the Welsh. Many of those pioneer Welsh settlers came to Carbondale, which gives Carbondale very deep Welsh roots.

To meet its market needs, the D&H made the decision in 1830 to conduct deep underground mining by means of shafts. To secure the expertise needed to establish shaft mines, the D&H recruited, in the summer of 1830, twenty mining families from Wales to come to Carbondale and to teach the D&H how to conduct deep underground anthracite coal mining and to work in the mines. Among those Welsh families were four Baptists—John and James Bowen and their wives. John was a deacon in the church whence he came; James a minister. In 1833 the First Baptist Church of Carbondale was formed (in 1832 or 33 the Welsh Calvinistic Methodist Church was organized here; later the Welsh Congregationalist Church).

Those Welsh miners established for the D&H in June 1831 in Carbondale the first deep underground shaft mine in America. The mining engineer in charge was Archibald Law, from Scotland. That mine opening was on the north side of Seventh Avenue on the west side of the D&H tracks, at the D&H Seventh Avenue crossing in Carbondale.

Additional Welsh miners were recruited by the D&H in October/November of the following year, 1832, when a party of seventy Welsh miners and their families came to Carbondale.

Those Welsh pioneers were soon followed by many thousands of Welsh men and women and their families who came here to work in the anthracite coal mines and to begin new lives for themselves.

The Welsh roots of Carbondale can all be traced to those 90 families of Welsh pioneers.

Associated with those pioneer Welsh settlers and their descendants are two very interesting and important “firsts” for Carbondale in the history of the Welsh in America.

1. the first Welsh “eisteddfod” (a traditional language, literature, music festival) to be held in America took place in Carbondale on Christmas Day, 1850;
2. the first lodge of “The Philanthropic Order of True Ivorites” (a patriotic Welsh order) was established in Carbondale in the fall of 1853.

In addition, these Welsh pioneer settlers in Carbondale established here three Welsh churches:

1. First Baptist Church

"FIRST BAPTIST CHURCH (WELSH). / In the summer of 1830 twenty Welsh families came to Carbondale to work in the new coal mines. Among them were four regular Baptists, John and James Brown and their wives. John was a deacon in the church whence he came, while James was a minister of the Baptist faith. Prayer and preaching meetings were soon commenced at the house of Deacon Bowen, on the site of the store of Patrick Moffitt, Jr., For a time the congregation consisted of only a few Welsh families. These subsequently united with the Greenfield church, but in the spring of 1833 took letters of dismission and organized the 'First Baptist Church of Carbondale,' with 43 constituent members, and subsequently built a house of worship, now standing on South Church street. The present value of the church property is \$5,000. The membership is 120. William Davies is superintendent of the Sunday-school." 1880, p. 449:

2. Welsh Calvinistic Methodist Church

"WELSH CALVINISTIC METHODIST CHURCH. / This church was organized as early as 1832 or 1833. The original leaders in Carbondale were Evan Price, John Evans, Daniel Moses and Daniel Scurry. For some time before building the church, meetings were held every Sabbath, alternately at the houses of the members. The first minister was Rev. John Davis, and the first regular preacher was Rev. John Griffiths. This organization has never been able to sustain a minister, but has had preaching nearly every Sabbath by ministers from other places. The present number of communicants is 35. The church property is valued at \$3,000. / A Sunday-school has been held in the church nearly every Sunday. The present number of scholars is 40. Reese Williams is the superintendent." 1880, pp. 449-50:

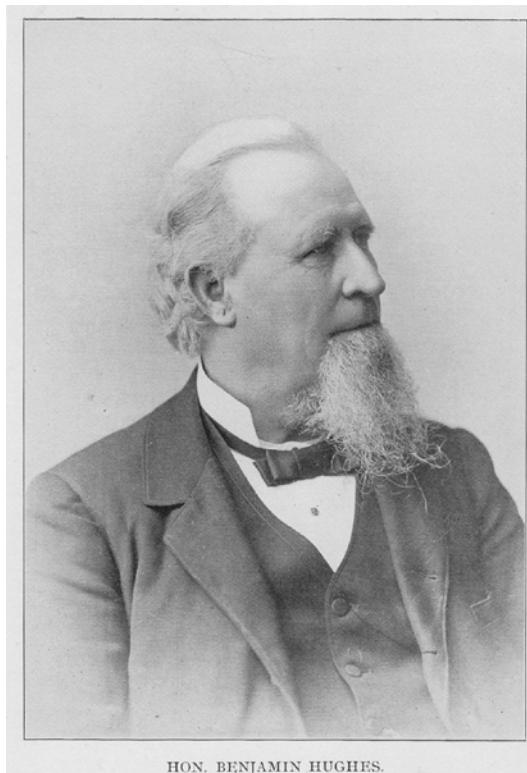
3. Welsh Congregational Church

"WELSH CONGREGATIONAL CHURCH. / This organization was effected about 1835, by a few Welsh families. They have a commodious church edifice on South Church street, valued at about \$4,000. Rev. L. Williams is the pastor." 1880, p. 450:

Welsh note: One of the primary figures in the Welsh community in northeastern Pennsylvania in the late nineteenth century was the Honorable Benjamin Hughes, a portrait of whom is given on pp. 185-186 of *Portrait and Biographical Record of Lackawanna County Pennsylvania*, 1897. From 1865 to 1897 (and after), he was the general mine superintendent for the Delaware, Lackawanna & Western Railroad Company. He was in charge thirty shafts and twenty-one breakers, which employed six thousand nine hundred and forty-seven men inside and three thousand three hundred and ninety outside, making the total number of men under his direction ten thousand three hundred and thirty-seven. He was also the president of the West Side Bank. He was born October 25, 1824, near Bryn-Mawr, Breconshire, Wales. His brother Evan was foreman in the mines at Avondale, PA, and was killed in the mine disaster there in 1869. Beginning in 1870, Benjamin Hughes resided at 1201 Washburn Street. He assisted in organizing the Ivorites Society at Scranton and was the first grand president, which office he held for about nine years.

Surely, James W. Resse and Frances Davies, the maternal grandparents of the author's father, Walter S. Powell, knew Benjamin Hughes.

Here is the photograph of the Honorable Benjamin Hughes that accompanies (p. 183) his biographical portrait in *Portrait and Biographical Record of Lackawanna County Pennsylvania*:



HON. BENJAMIN HUGHES.

From Edward George Hartmann's *Americans from Wales* (New York, 1883) we have learned the following information about the Welsh in northeastern Pennsylvania at the close of the nineteenth century and at the beginning of the twentieth century:

- The year 1890 was the peak year of Welsh immigrant strength in America
- In 1890 were 8,578 Welsh immigrants in Wilkes-Barre; total Welsh stock (immigrants+ second generation Welsh Americans) in Wilkes-Barre in 1890: 21,552
- In 1890 there were 7,708 Welsh immigrants in Scranton; total Welsh stock (immigrants+ second generation Welsh Americans) in Scranton in 1890: 19,358
- There were 30 Welsh churches in the Scranton area, 14 of which were flourishing in 1967
- There were 45 Welsh churches in the Wilkes-Barre area, 28 of which were flourishing in 1967
- 100,143 Welsh lived in Pennsylvania in 1900. That's one-third of the Welsh in America at the time.
- Upper Lackawanna Valley Welsh Churches:
Clifford Township: Welsh Hill Congregational, 1835
Forest City: Welsh Baptist, 1888-1890; Welsh Congregational, 1891-1928
Carbondale: Welsh Baptist, 1830-1898; Welsh Congregational, 1831-1930; and Welsh Presbyterian, 1832-1860
Jermyn: Welsh Baptist, 1875-1895; Welsh Congregational, 1869-1920; Welsh Presbyterian, 1872-1877
Mayfield: Welsh Baptist, 1875-1910

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The Gritman Collection and the History of the D&H Gravity Railroad

In 2001, a large collection of scrap books, photographs, publications, and materials that relate directly to the history of the city of Carbondale, including the original Carbondale City seal and a Gritman photo album, were donated to the Carbondale Historical Society by Mrs. Emma Matilda (Fox) Gritman, widow of the Reverend William Ball Gritman. These materials were gathered and preserved by P. C. Gritman and his wife, nee Jane Ball, and their descendants (William Ball Gritman and family; William Ball Gritman 2nd and family).

We learned how this important donation took place on May 24, 2012, when Rev. and Mrs. Donald H. Ashmall visited the Carbondale Historical Society.

Rev. Ashmall's stepfather was the Rev. William B. Gritman. At the time that Mrs. Emma Gritman (widow of Rev. William B. Gritman) was about to enter an assisted living facility, she and her son Rev. Donald H. Ashmall went through Mrs. Gritman's holdings and, at the urging of

Rev. Ashmall, a large box was established in which items to be sent back to Carbondale were placed. This is the large box that was then sent back to Carbondale, where the contents of that box, now in five archival boxes, are known as the Gritman Collection.

In most of the volumes in this series on the history of the D&H, references will be made to the materials in a Gritman scrapbook or in the Gritman collection, now in the holdings of the Carbondale Historical Society.

Mrs. P. C. Gritman

The several remarkable scrap books of newspaper articles about Carbondale now in the collection of the Carbondale Historical Society were created by Mrs. P. C. Gritman, who carefully read all the daily and weekly Carbondale newspapers and clipped out articles that she regarded as important to preserve. I can say with some assurance that Mrs. Gritman surely found important articles that we might never have found in our reading of those newspapers a century later. And for that, we are indebted to Mrs. Gritman for her painstaking efforts to preserve the history of her beloved Carbondale.

Mrs. P. C. Gritman was born Jane Ball on February 18, 1833. She was the daughter of William Ball and Mary Ann Smith. "Her father came here [Carbondale] from New York city with five other young men to erect the first engines on the gravity road. [He was the first engineer on Plane No. 1 when the Gravity Railroad opened on October 9 1829.] He was the only one of the party to settle here permanently in the employ of the D. & H. and was soon given charge as master mechanic of all the stationary engines on this side of the mountain. [For many years, William Ball was the superintendent of motive power and the first master mechanic of the D. & H. Gravity Railroad.] Her [Jane Ball] grandparents were Captain Charles and Ruth Godfrey Smith. The former had charge of portions of the D. & H. work here for many years and built a section of the D. & H. canal before coming to Carbondale." Mrs. P. C. Gritman died on February 24, 1909 ("Death of Mrs. P. C. Gritman Is Sad Loss to Community," *Carbondale Leader*, February 24, 1909)



In the Gritman family photo album, now in the collection of the Carbondale Historical Society, is this photograph of Mrs. P. C. Gritman.

In the article in *The Scranton Republican* (February 25, 1909) titled "Mrs. Philo C. Gritman Entered into Rest" we read: "By birth and character Mrs. Gritman was one of Carbondale's noblest women. Member of a family noted for its achievements in the engineering world of several decades ago, she possessed remarkable attainments along certain lines, and had accumulated probably the most valuable and interesting collection of historical matter to be found in the city. She had an abiding love for the town that saw her birth and was the scene of

her entire career, and she watched its growth and development with wonderful gratification and pride. Her mental faculties were well trained and she enjoyed their unimpaired use to the end. With keen observation and a memory remarkable for its retentiveness, Mrs. Gritman's mind was a storehouse of local and general history, and with much chronological accuracy she could recall numberless reminiscences and anecdotes of the community's earlier days and its growth from a hamlet of the almost unbroken wilderness to a live, bustling city."

P. C. Gritman

Philo Callender Gritman was one of the most civic-minded and public-spirited individuals in the entire history of Carbondale. In 2009, the present author wrote an article about the man that was published in the August 19, 2009 issue (p. 14) of *The Carbondale News*. Here is that article.

"P. C. Gritman, One of City's Founding Fathers, Interred in Historic Maplewood Cemetery"

Philo Callender Gritman, one of the most civic-minded and public-spirited individuals in the entire history of Carbondale, can be called, without reservation, one of the founding fathers of the City of Carbondale.

At the time of his death, on February 10, 1903, he was one of the best known and highly respected residents of the entire Lackawanna Valley. His earthly remains are interred in Maplewood Cemetery on the east bank of that section of the cemetery that is known as Welsh Hill.

He was born in Sherburne, NY, on October 29, 1828, and with the Gritman family moved to Dundaff in 1829, where his father, Dr. William Gritman, practiced medicine. As a young man, there, P. C. Gritman began his study of law.

In 1847, the Gritman family moved to Carbondale, where P. C. Gritman taught in the Carbondale Academy and Lackawanna Institute, which was one of the leading educational institutions in this section. Succeeding H. J. Newell, he ultimately became the second principal of that school, which was located in Temperance Hall at the corner of Church Street and Salem Avenue.

At the same time, Gritman continued to read law and entered the law office of D. N. Lathrope, Carbondale's first lawyer. In 1848, he completed his law course and was admitted to the bar of Luzerne County at Wilkes-Barre, and later, when Lackawanna County was established, he was admitted to the Lackawanna County bar.

In the second year of his law practice, he formed a partnership with Samuel Hodgdon, which was dissolved a year later when Hodgdon became prothonotary of Luzerne County.



In the Gritman family photo album, now in the collection of the Carbondale Historical Society, is this photograph of Philo Callender Gritman.

Throughout his adult life Gritman practiced law in Carbondale, playing an active role in the formation of Lackawanna County. At the time of his death, he was the senior member of the Lackawanna County bar.

Gritman, also trained as a civil engineer, was an active participant in the incorporation of the city of Carbondale in 1851 as a city of the third class. To him was given the privilege of outlining the boundaries of the City of Carbondale and the marking of the boundary lines of the several wards, for which he was paid \$15.

The original city lines were established by Mr. Gritman under difficulties that could only be overcome by the ardent civic feeling he had to see the dignity of a city and its powers conferred upon the town that was the birthplace of the great anthracite coal industry.

As the decision to make application for a charter was somewhat belated it was necessary to act quickly if the City's petition for a charter was to be heard by the legislature of 1851. With that in mind, and disregarding both the end-of-the-year spirit that moved the people at the time to participate in the festivities of the season as well as the knee-deep snow on the ground, P. C. Gritman set out, on New Year's day of that year, accompanied by Townsend Poore, of Scranton, and Thomas Hurley, as chain-boys, and delineated the City's limits before the day was over.

On March 15, 1851 the City of Carbondale, with 5,000 inhabitants, was incorporated as a city of the third class.

Thanks to the enlightened and civic-minded generosity of the descendants of P. C. Gritman, the original Carbondale city seal, created at the time of the City's incorporation in 1851, is today among the historic artifacts in the City's collections.

P. C. Gritman's worth and usefulness to the community were attested to after Carbondale became a city when he was elected district attorney in the Carbondale mayor's court, succeeding George W. Perkins, the first official. His term was from 1856 to 1859, which was followed by two more terms, 1862-65, 1869-71.

He was likewise city attorney for several terms and served on the City's Select and Common Councils. He was later elected for two terms, beginning in 1857, to represent Luzerne County in the Pennsylvania legislature.

He readily attracted the interest and won the confidence of his colleagues in the state legislature and asserted himself by being regarded as the Democratic leader of the house, being named, during his second term, as a candidate for the speakership.

An edifying and inspiring trait of P. C. Gritman's character was his intense and active interest in civic and national affairs. The opening of Richmond's hall, on the third floor of the Pascoe & Scurry building (SE corner of Salem Avenue and Main Street) on January 25, 1856, was a public event that was marked by a stirring and prophetic talk by P. C. Gritman.

He repudiated the false story that was being circulated to Carbondale's disadvantage, that the rich coal deposits* here were about exhausted; and he rightly predicted that within a brief span of

time a railroad (the Jefferson branch of the Erie Railroad from Carbondale to Lanesboro) would connect us on the north with the Erie Railroad.

[* *Hollister*, 1880, p. 195: "The capacity for mining and transporting coal by the Delaware & Hudson Canal Company is such that should an emergency arise, the product could be increased to ten million tons per year from the numerous mines burrowed into the mountains along the Lackawanna and Wyoming Valleys for forty miles. / Its vast coal deposits, estimated at four hundred millions of tons, implies many years of production and prosperity of a corporation derided in its youth by Philadelphians because of its New York origin and proclivities."]

During the Civil War, his patriotic spirit was shown, in September 1862, when he was named captain of the Luzerne Artillorists, a Carbondale state militia company of 50 men, that was called to Harrisburg when the commonwealth was invaded by the Confederates.

On August 25, 1852, P. C. Gritman and Jane Ball, the eldest daughter of William and Mary Ann (Smith) Ball, who was born on February 18, 1833 and who died on February 24, 1909, were married. The marriage, which was solemnized by Rev. O. E. Ward, Presbyterian minister from Dundaff, took place in the Ball house on Canaan Street, later the residence of the William Bowers family.

Jane Ball was the daughter of William Ball, for many years the superintendent of motive power and the first master mechanic of the D&H Gravity Railroad.

William Ball came to Carbondale in the 1820s from New York City with five other young men to erect the first engines on the Gravity Railroad planes out of Carbondale, Mr. Ball serving as the first engineer on Plane No. 1 when the road opened on October 9, 1829.

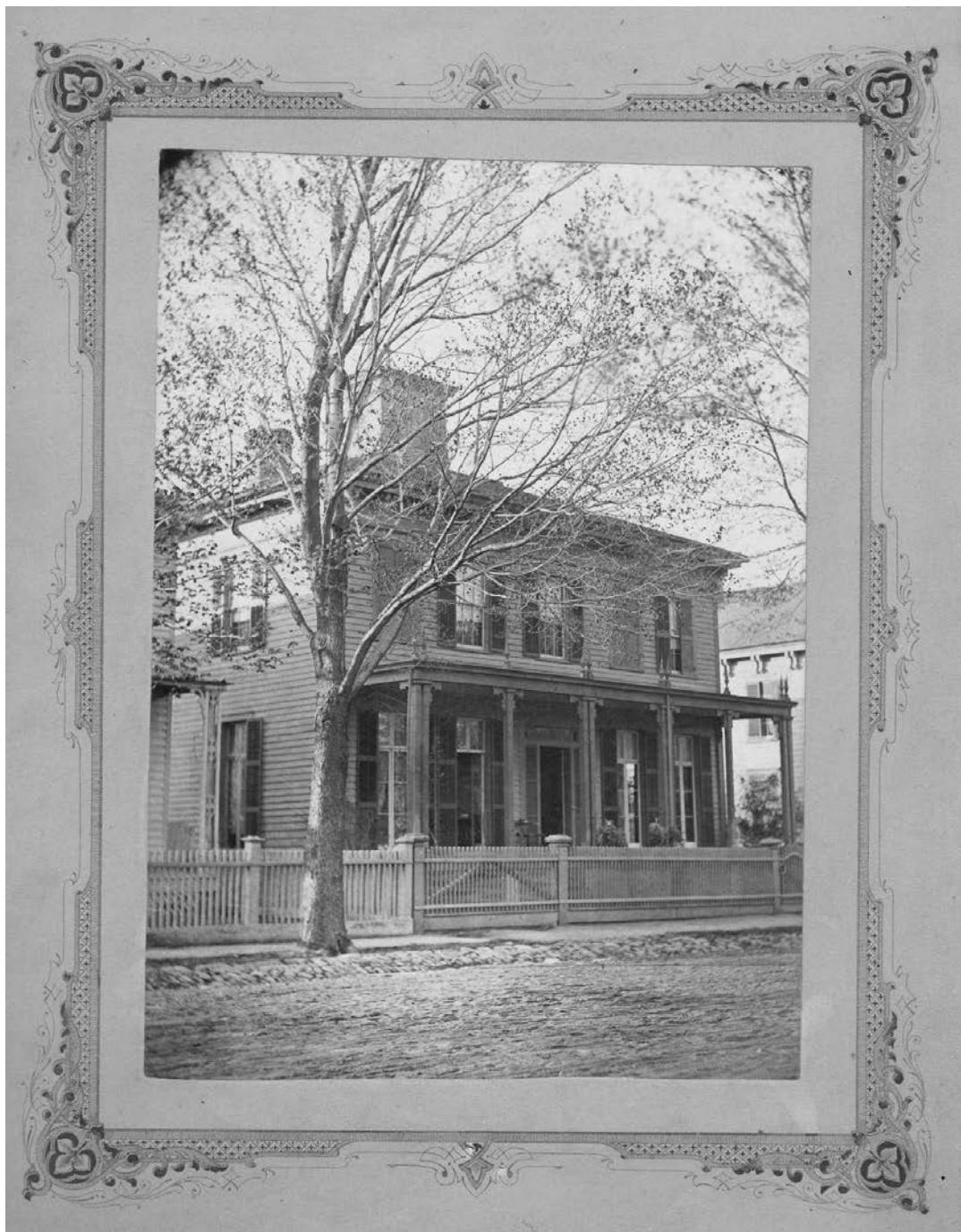
In 1838, Mrs. P. C. Gritman accompanied her father to New York City to witness the arrival in that port of the first trip of the *Great Western*, the first trans-Atlantic steamer to make regular trips across the Atlantic ocean and the largest ship ever built up to that time and for some years after that.

At the time of P. C. Gritman's death in 1903, his son, William B. Gritman, Esq., was the managing editor of the Carbondale *Evening Leader*.

Rehabilitation of the P. C. Gritman burial site, and the entire historic Maplewood Cemetery, is now underway. To participate in this important restoration initiative, contact the Cemetery at either Post Office Box 151, Carbondale, or by phone at 570-282-0385."

Here are three photographs of the P. C. Gritman house on North Main Street in Carbondale. It seems safe to conclude that the two persons seated on the front porch in this photograph are Mr. and Mrs. Philo Callender Gritman. The Scotchlas Funeral Home is now located in this building. All three photos in the Gritman Collection of the Carbondale Historical Society.





The P. C. Gritman house on North Main Street in Carbondale. Photo in the Gritman Collection of the Carbondale Historical Society.



Written on the back of this photograph is the following note: "View of North Main Street / Carbondale, / Pa. / March 1st 1892. (Looking South) / Residence of P. C. Gritman / Second House from corner" Photo in the Gritman Collection of the Carbondale Historical Society.

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